Pit and Quarry

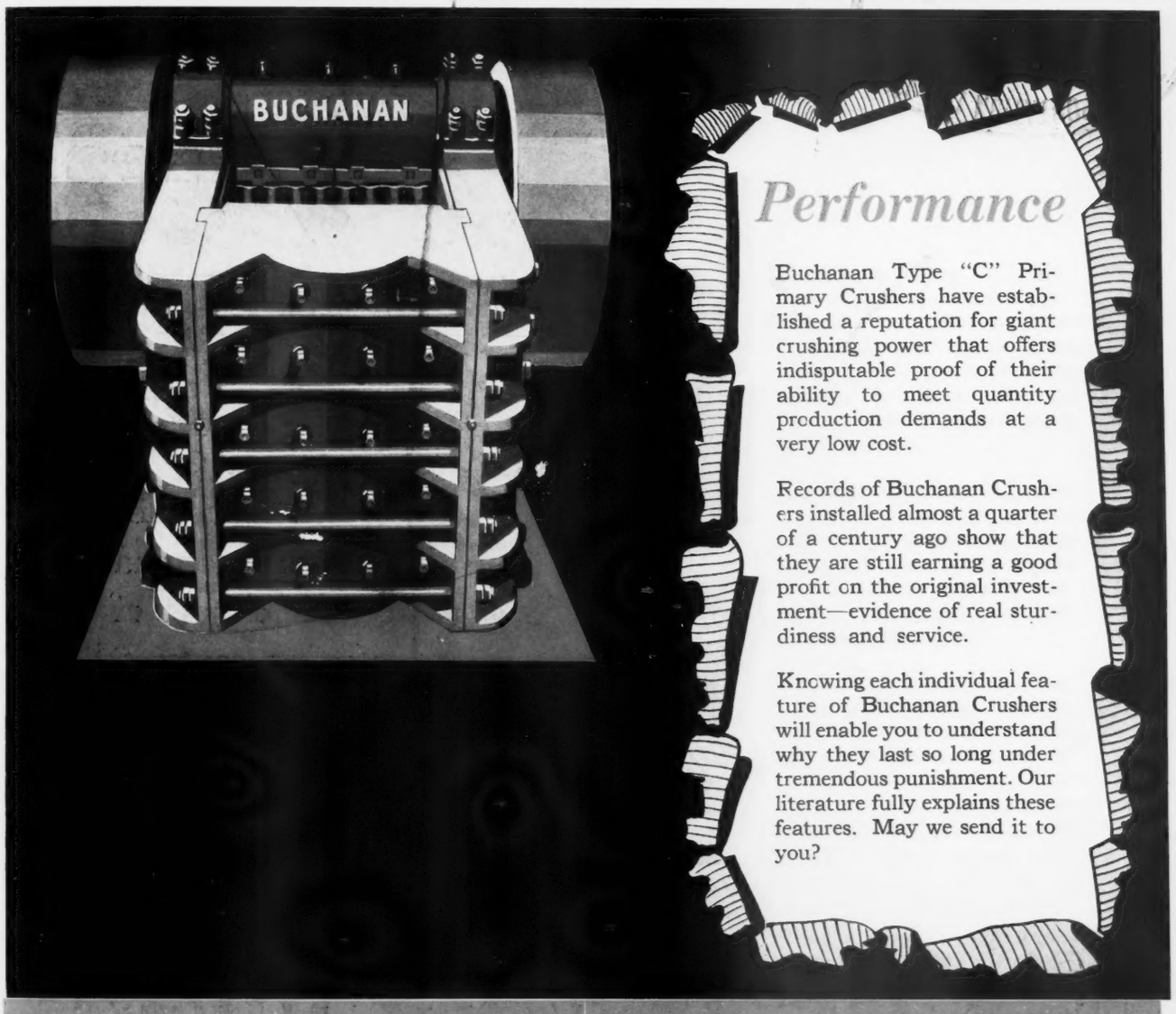
With which is consolidated

CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Reaches Largest Number of Plants

Vol. XIX **JANUARY 29, 1930** **No. 9**



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With which is consolidated CEMENT-MILL & QUARRY

Member Audit Bureau of Circulation

Reaches Largest Number of Plants

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H. W. BAUMGARTNER, *President* V. E. LARSEN, *Vice-President*

ARTHUR J. HOSKIN, *Editor*

J. O. DURKEE, *Assistant Editor*
W. E. TRAUFFER, *Assistant Editor*
S. A. PHILLIPS, *Assistant Editor*
HARRY F. UTLEY, *Assistant Editor*
G. B. MASSEY, *Associate Editor*
G. F. SONDRAKER, *Associate Editor*

New York Representative:
L. M. WEISS, 315 W. 86th St.; Telephone, Schuyler 6294; New York, N. Y.

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Vol. XIX CHICAGO, JANUARY 29, 1930 No. 9

National Crushed Stone Association's 1930 Convention Largest in Its History

Manufacturers' Exhibits Were Many and Interesting

Program as Presented

Monday, January 20

10 A. M.

W. F. Wise, president, presiding.

Address of welcome—Hon. Russell Wilson, Mayor of Cincinnati, Ohio.

Response for the Association—E. E. Evans, Whitehouse Stone Co., Toledo, Ohio.

Report of the president—W. F. Wise.

Reports of directors on business conditions in 1929 and outlook for 1930.

Appointment of convention committees: Resolutions, Nominating, Finance, Auditing, Reception, Publicity, and Constitution and By-Laws.

Report on incorporation of association—Otho M. Graves.

1 P. M.

Greeting luncheon—Everyone, including active and associate members, as well as guests, is cordially invited to attend.

Luncheon address—Hon. Myers Y. Cooper, Governor, State of Ohio.

2:30 P. M.

A. L. Worthen, member, executive committee, presiding.

Report of Membership Committee—J. R. Boyd, chairman.

"To What Extent Does a Highway Bond Protect the Materials Producer?"—M. O. Garner, General Counsel, National Surety Co., New York City.*

Discussion—Led by Harold Williams, Member of the Boston Bar, Boston, Mass.

"Simplification in Industry"—R. L. Lockwood, Division of Simplified Practice, U. S. Bureau of Standards, Washington, D. C.

Report of Committee on Standards—F. S. Jones, chairman.

Sub-committee for the Standardization of Commercial Sizes of Crushed Stone—A. T. Goldbeck, chairman.

Sub-committee for the Standardization of Drilling Equipment—A. L. Worthen, chairman.

Sub-committee for the Standardization of Plant Equipment—F. W. Schmidt, chairman.

Sub-committee for the Standardization of Specifications and the Marking of Supplies and Equipment—John Rice, Jr., chairman.

Sub-committee for the Standardization of Quarry Equipment—A. G. Seitz, chairman.

Discussion.

7:30 P. M.

Formal opening of Manufacturers' Division Exposition of Quarry Equipment, Machinery and Supplies—Exposition Room.

Smoker and entertainment.

Tuesday, January 21

10 A. M.

H. E. Bair, member, executive committee, presiding.

"Transportation—Past and Present"—M. J. Gormley, exec. vice-president and chairman, Car Service Division, American Railway Association, Washington, D. C.

Report of Committee on Research—John W. Stull, chairman.

"Some Researches and Their Practical Application"—A. T. Goldbeck, director, bureau of engineering, National Crushed Stone Association.

"Pre-mixed Concrete"—Illustrated by motion pictures—Arthur C. Avril, Avril Tru-Batch Concrete, Inc., Cincinnati, Ohio.

Report of auditing committee.

Report of committee on finance.

Further report on incorporation of association—Otho M. Graves.

General business.

1:15 P. M.

Luncheon—Operating Men, Superintendents and Manufacturers.

A. G. Seitz, General Crushed Stone Co., presiding.

"In What Respects Should the Quality of Crushed Stone Be Improved?"—A. S. Rea, chief engineer, Bureau of Tests, Ohio Dept. of Highways, Columbus, Ohio.

Report of committee on the mechanical elimination of dust—F. O. Earnshaw, chairman.

"Vibrating Screens"—C. G. Adams, France Stone Co., Toledo, Ohio.

"Revolving Screens"—F. W. Schmidt, Jr., North Jersey Quarry Co., Morristown, N. J.

Question box.

1:15 P. M.

Luncheon—Salesmen

Wm. E. Hilliard, New Haven Trap Rock Co., presiding.

"Concrete Residence Floors"—R. E. Copeland, Portland Cement Association, Chicago, Ill.

"The Importance of Proper Specifications for Crushed Stone"—L. C. Bonnell, F. R. Upton, Inc., Newark, N. J.

Discussion—Led by A. B. Rodes, Franklin Limestone Co., Nashville, Tennessee.

* Mr. Garner not attending, this topic was handled by Mr. Williams, who was scheduled to discuss it.

"Stone Sand—Its Successful Use and Characteristics"—M. L. Jacobs, Bethlehem Mines Corp., Bethlehem, Pa.
Discussion—Led by Dr. H. F. Kriege, France Stone Company Laboratory, Toledo, Ohio.
Report of committee on ballast—E. J. Krause, chairman.
"Group Advertising to Promote Sales"—Col. E. J. McMahon, executive secretary, St. Louis Quarrymen's Association.
"Individual Advertising"—D. W. Saffel, sales manager, Greer Limestone Co., Morgantown, W. Va.
Discussion—Led by C. A. Munson, sales manager, New Haven Trap Rock Co., New Haven, Conn.

1:15 P. M.

Luncheon and Annual Meeting of the National Agstone Association.

N. G. Farber, president, presiding.
Address by President N. G. Farber.
"What the Farmer Can Expect from Liming Material"—Robert S. Salter, chief, soils department, Ohio State University.
Informal discussion.
Committee reports.
Report of officers.
Election of directors.
Election of officers.
Address of president-elect.

6 P. M.

Meetings of Local Associations and Annual Meeting of Manufacturers' Division.

Pennsylvania Stone Products Association, dinner meeting.
Manufacturers' Division Annual Business, dinner meeting.
New York State Crushed Stone Association, dinner meeting.

Wednesday, January 22
10 A. M.

W. F. Wise, president, presiding.
"A Summary of the Various Types of Sewage Treatment Works with Overall Costs and Comments on Their Application"—Samuel A. Greeley of Pearse, Greeley and Hansen, hydraulic and sanitary engineers, Chicago, Ill.
"Tests of Pavement Concrete Being Conducted by the Bureau of Public Roads"—F. H. Jackson, senior testing engineer, U. S. Bureau of Public Roads, Washington, D. C.
"Airport Paving"—R. H. Simpson, chief engineer, Department of Public Service, Columbus, Ohio.
"The Development of County Roads"—Chas. M. Upham, engineer-director, American Road Builders' Association, Washington, D. C.
Report of committee on resolutions.
Report of committee on constitution and by-laws.
Report of nominating committee and election of officers.
Greeting of the re-elected president.

1 P. M.

Buffet luncheon was served in the Exposition Hall for those wishing to avail themselves of the opportunity for conference with manufacturers of machinery, equipment and supplies.

2 P. M.

A. S. Lane, Springfield, Mass., presiding.
Report of committee on trade practice—Otho M. Graves, chairman.
Report of accident prevention committee—H. E. Rodes, chairman.
Presentation of National Crushed Stone Association Safety Trophy—By a representative of the United States Bureau of Mines.
Address—L. R. Cartwright, Vice-Pres., Mid-West Crushed Stone Co., Indianapolis, Ind.
"A Service for Employers in the Crushed Stone Industry"—J. V. Scott, National Safety Council, Chicago, Ill.
General Business.

7:30 P. M.

ANNUAL BANQUET
ROOF GARDEN, HOTEL GIBSON

Toastmaster—Russell Rarey, The Marble Cliff Quarries Company, Columbus, Ohio.
"Shakespeare—The Master Salesman"—W. B. Burruss, internationally known business counsellor.
"The Future of Business"—Geo. E. MacIlwain, business economist, lecturer, author and analyst.
"Cooperation"—Captain Irving O'Hay, philosopher and humorist.

Thursday, January 23
10 A. M.

Trade practice conference for the entire crushed stone industry, called by the Federal Trade Commission and presided over by its chairman, Judge E. A. McCulloch.

8 P. M.

Meeting of the board of directors.

WITH a registration that promised to set a new high record for attendance, the Thirteenth Annual Convention of the National Crushed Stone Association opened in the roof garden of the Gibson Hotel, Cincinnati, at 10:20 o'clock Monday morning, January 20. By Wednesday evening the registration lists showed that nearly 500 active and associate members were in attendance and the number of guests registered so brought up the total that this was the best attended convention in the history of the association.

In spite of a severe attack of bronchitis, President W. F. Wise attended the convention and committee meetings and presided at the Monday morning session, which opened with an address of welcome by Mayor Russell Wilson of Cincinnati. The mayor spoke approvingly of President Hoover's construction program calling for an increased use of crushed stone, and referred to Cincinnati's paving work, as a result of which 60 miles of streets were paved in three years as compared with only 54 miles in the preceding 10 years. After remarking on Cincinnati's having built the country's first large concrete office building, the mayor called attention to local building programs which will provide, among other projects, for the erection of a 48-story office building and a $50,000,000 railroad terminal that will absorb large amounts of crushed stone.

In responding for the association, E. E. Evans, of the Whitehouse Stone Co., Toledo, O., reminded those present that this was the third association convention held in Ohio, a fitting recognition of Ohio's prominent position in the crushed stone industry. Mr. Evans reported that the state's production of limestone in 1928 amounted to 17,000 tons, of which about one-half was used in building and maintaining bituminous macadam roads in Ohio. About 3,000,000 tons of the remainder

was used for fluxing purposes in the steel and iron industry, about 2,600,000 tons in the making of concrete, and about 1,700,000 tons in the manufacture of cement, while 1,300,000 tons was made into lime.

President Wise reported briefly on the many activities of the association's various committees, unfolding to his hearers a record of commendable progress in all directions. He was followed by the reading of reports on business conditions throughout the country as observed by the association's directors in their respective territories. The opinion that business in 1930 will be considerably better than in 1929 was almost unanimous, and was in complete accord with the opinions of many crushed-stone producers as recorded in the December 18, 1929 issue of PIT AND QUARRY. In addition to being general, the feeling of optimism which characterized the reports of these directors seemed fully warranted by the conditions described by the various speakers, emphasis being placed in many cases on the increased road-building activities which have been scheduled in many states for 1930.

W. M. Andrews, of the Lake Erie Limestone Co., Youngstown, O., reported that 1929 had been a good year for producers of fluxing limestone, but only a fair year for producers of commercial stone. Slag became a very severe competitor. He considers the prospects for 1930 very bright on account of the large road-building program of the state of Pennsylvania.

H. E. Bair, of the France Stone Co., Toledo, O., in describing some of the difficulties that beset Ohio producers during 1929, drew attention to the unwarranted increase in production facilities despite a falling off in demand and showed that the reduction in prices brought about by the resulting keenness of competition was the natural outcome.

Russell Rarey

Greater harmony among producers in the matter of prices—their quotation and maintenance — was reported by L. R. Cartwright, of the Mid-West Rock Products Corp., Indianapolis, Ind. He advocated support for the movement in favor of cash discounts and said that a discount of 10 per cent for payment in 30 days would tend toward the elimination of irresponsible contractors. He expects 1930 to be better than the average year.

J. R. Boyd
Re-elected Secretary

The sale of ½-in. stone proved to be one of the chief problems in eastern New York in 1929, according to J. E. Cushing, of the Cushing Stone Co., Schenectady, N. Y., and he suggested the advisability of finding some new market for material of that size. Business in 1929 was about the same in volume as in 1928, and was characterized by a steady demand for material.

The report of C. M. Doolittle, of Hamilton, Ont., who was absent on account of the illness and subsequent death of his mother, stated that the business in Canada in 1929 was prosperous, because building activities increased $104,000,000 over 1928, and the railroads were heavy purchasers of rock for ballast.

Pennsylvania's 1930 road-building program should have a wholesome effect on the crushed-stone business in that state, according to F. O. Earnshaw, of the Carbon Limestone Co. of Youngstown, O. The state will build between 1,100 and 1,200 miles of concrete roads in 1930 in addition to other road-building and maintenance activities, and 1930, like 1929, should be one of the biggest years in the history of the crushed-stone business.

Although 1929 was below the average in stone production, progress was made in other directions in the opinion of E. Eikel, of the Dittlinger Lime Co., New Braunfels, Texas. He was able to report a material reduction in the number of accidents and especially serious accidents. The outlook for 1930 is, in his opinion, fair, although the State of Texas has planned a large road-building program.

Although costs in 1929 remained about the same as in 1928, prices were lower, according to E. E. Evans, of the Whitehouse Stone Co., Toledo, O. This fact, in conjunction with a lessened demand, resulted in decreased profits, and the outlook for 1930 seems to be no better.

John Rice, of the General Crushed Stone Co., Easton, Pa., read the report of his associate, Otto M. Graves. In the latter's opinion, 1929 was about the same as 1928, so far as the profitable volume

A. G. Seitz, General Crushed Stone Co., Syracuse, N. Y.

of business is concerned. The outlook is quite satisfactory.

W. E. Hilliard, of the New Haven Trap Rock Co., New Haven, Conn., found 1929 a satisfactory year, five producers showing an increase in the volume of business done and only one a decrease. New plants built and building will add 2,500 to 3,000 tons to the daily production in his territory. The outlook for 1930 justifies an optimistic view of the future.

W. P. Hodgkins, of Chicago, reported unfavorable conditions in the stone business, on account of boat competition in stone, sand and gravel, the unsettled tax situation in Chicago, and keen competition. The depletion of state highway funds has kept road-building at a low level.

Prices have been stabilized in spite of the fact that production capacity exceeds the demand, according to E. J. Krause, of the Columbia Quarry Co., St. Louis, Mo. The limestone business in 1929 was slightly better than in 1928 and 1930 should be above 1929 in production, especially as St. Louis City paving specifications now allow the use of limestone as a street and alley surfacing material.

A. S. Lane, of John S. Lane & Son, Inc., Springfield, Mass., found 1929 production at least 25 per cent above that of 1928, and thinks that 1930 should be a good year. Prices remained unchanged.

Despite the fact that 1929 was a subnormal year, due to the deferment of road work and a reduction in building activities, E. J. McMahon, of the St. Louis Quarrymen's Association, feels that 1930 should be a satisfactory year. Road work should be resumed and more building construction should be expected.

Overproduction and low prices are part of the outlook for 1930, in the opinion of H. E. Rodes, of the Franklin Limestone Co., Nashville, Tenn. Production in 1929 was in excess of the demand and keen competition and low prices resulted.

Much the same opinion was voiced by F. W. Schmidt, Jr., of the North Jersey Quarry Co., Morristown, N. J. He reported that, although some plants are running at but 50 per cent of their capacity, others are increasing their facilities, so that the overproduction and low prices that marked 1929 business are likely to continue. He thinks that the association should go on record as favoring a restricted output in the interest of stabilizing the industry. During last year weather conditions kept demand at a low point, so that 1929 business was 10 per cent lower than that of 1928.

The report of J. F. Schroeder, of the Linwood Cement Co., Davenport, Iowa, complained of low prices and of the competition of cement plants which sell aggregates in connection with cement and quote a combined price for the two products. As far as volume is concerned, business in 1929 was satisfactory.

John W. Stull, of the Liberty Lime & Stone Co., Rocky Point, Va., considers the outlook for 1930 better than that for 1929, owing to increased building activity.

The stone industry was much depressed in 1929, according to T. I. Weston, of the Weston & Brooker Co., Columbia, S. C., but in view of new money available for road-building this year, the business should be about normal.

E. G. Lewis, chairman of the Board of Directors of the Manufacturers' Division, reported the addition of the following new members:

American Steel & Wire Co.
Bethlehem Steel Co.
Cleveland Rock Drill Co.
Detachable Bit Corp.
Gardner-Denver Co.
Keystone Driller Co.
Linn Mfg. Co.
Mack-International Truck Co.
McLanahan Stone Machine Co.
Ohio Power Shovel Co.
Quaker City Rubber Co.
Ross Screen & Feeder Co.
Westinghouse Electric Mfg. Co.
Woodford Engineering Co.
Texas Company.

President Wise then announced the appointment of the following convention committees and chairmen:

Resolution Committee—John Rice
(General Crushed Stone Co., Easton, Pa.)
Nominating Committee—E. J. Krause
(Columbia Quarry Co., St. Louis, Mo.)
Auditing Committee—James Savage
(Buffalo Crushed Stone Co., Buffalo, N. Y.)
Finance Committee—A. L. Worthen
(Connecticut Quarries Co., New Haven, Conn.)

Reception Committee—B. T. Van Camp
(Van Camp Stone Co., Cincinnati, Ohio)
Publicity Committee—J. R. Boyd
(National Crushed Stone Assn., Washington, D. C.)
By-Laws and Constitution Committee—F. T. Gucker
(J. T. Dyer Quarries Co., Morristown, Pa.)
Ladies' Entertainment Committee—Mrs. A. Acton Hall
(Ohio Marble Co., Piqua, Ohio).

Otho M. Groves, of the General Crushed Stone Co., Easton, Pa., then presented his report on the incorporation of the National Crushed Stone Association which, since its formation, has been an unincorporated body. He read the necessary documents to the convention, preparatory to offering a resolution authorizing the transfer of the old association's property to the new association, and the resolution was put to a vote and counted.

At the luncheon which followed the morning session Governor Myers Y. Cooper, of Ohio, was the guest of honor and electrified his audience first by his humorous anecdotes and, later, by his spirited plea for adequate road-building in the rural sections of the State, for improvement in what he termed the secondary road system of the State. He pointed out forcibly that good roads are an essential to farming prosperity and that the surest and most effective manner of giving farm relief lies in the provision of a complete highway system. Ohio, as the result of an executive order new in the history of the state's highway work, let $2,250,000 worth of road contracts in December, and equally large contracts will be let in January, February, and March. Heretofore, the signing of these contracts has been deferred until spring, with resulting uncertainty on the part of contractors and material producers. Counties and townships will spend $50,000,000 and the state $34,000,000 for improved roads in Ohio, while municipalities will spend $150,000,000, a total of $234,000,000, for the present year. Probably 70 per cent of this expenditure will be put under a contract during the first six months of 1930.

The smoker held on Monday evening was well attended. Light refreshments were served and there were vocal, instrumental and dancing acts for the entertainment of those present.

In the absence of M. O. Garner, of New York, who was scheduled to speak upon "To What Extent Does a Highway Bond Protect the Materials Producer?" Harold Williams, also an attorney but from Boston, who had expected to discuss the paper, was called upon to take Mr. Garner's place. This he did most graciously. He stated his disfavor of bonds for the protection of producer, upon the ground that surety companies write their documents in such verbiage that ample opportunity is offered frequently to plead non-responsibility through technicalities. He recommended the plan that is already practiced in many places of having the municipality, county or state withhold sufficient amounts from contractors' payments to cover bills for all unpaid materials and labor.

John Rice, President General Crushed Stone Company

R. L. Lockwood of the U. S. Bureau of Standards Division of Simplified Practice, explained that this division came into existence eight years ago directly as an order from Herbert Hoover, then secretary of commerce. Its original function was to simplify business practice following the disturbances due to war, but it continues to serve the country permanently. This division possesses no executive nor police powers. It offers suggestions which may be adopted by industries on their own initiative.

In speaking upon "Transportation—Past and Present," M. J. Gormley, executive vice-president, and chairman of the car service division of the American Railway Association, gave statistics which prove that our American railroads are in a prosperous condition especially when judged by their handling of freight.

Shippers no longer have vexation due to car shortage because the railroads are continually maintaining their old cars in condition for steady use and are purchasing new cars. Mr. Gormley complimented crushed-stone producers upon their

A. L. Worthen, executive committee, National Crushed Stone Association, New Haven, Conn.

improved facilities for loading and unloading shipments. He declared that the railroads are working at the highest efficiencies ever attained. Reduction in operating costs has permitted the establishment of lower, more favorable freight rates.

The functions of regional shippers' advisory boards were explained and incidents cited to show their beneficial practices. Our railroads have budgets for 1930 betterments far in excess of corresponding budgets for 1929. Because transportation was never more dependable, prices are no longer inflated, and credits have become easy, he predicted a big year for the crushed-stone industry.

Support for Research

As chairman of the research committee, John W. Stull took every opportunity that arose to enhance the members' financial interest in the serious work that is being conducted by the director of the Bureau of Engineering. It appeared that much anticipated as well as current research is in jeopardy because of the adverse financial status. Another engineer should be engaged to assist Mr. Goldbeck.

A. S. Rea, chief engineer, Bureau of Tests, Ohio Department of Highways, in speaking upon improvements in the quality of crushed stone that is supplied for highway construction contracts, stressed three things. All such aggregates should be gauged by the intrinsic quality of the stone itself, its sizing or grading, and its cleanliness or freedom from coatings. He feels that the chief trouble inheres in the second item—that is, in the proper sizing of the raw aggregates—and this is often due to the automatic segregation that occurs after the aggregate has been carefully graded at the quarry plant.

The official program provided addresses by practical operators who, from ample experience, are qualified to speak upon the relative merits of vibrating screens and revolving screens. C. G. Adams, of the France Stone Company, Toledo, explained practices with vibrators in two of his company's plants, but W. R. Sanborn, of the Lehigh Stone Company, Kankakee, was not present to similarly discuss revolving screens. F. W. Schmidt, Jr., of the North Jersey Quarry Company, Morristown, was drafted to substitute. Considerable discussion pertained to the difficulty in adopting sizes of screen openings for the two types of machine to produce similar grades of stone.

Tuesday afternoon one session was devoted to a luncheon and a group meeting to discuss sales problems and related subjects. William E. Hilliard of the New Haven Trap Rock Company, New Haven, presided.

R. E. Copeland, of the Portland Cement Association, spoke on "Concrete Residence Floors." He told of the increasing use of this type of floor and described the most common types, showing lantern slides of each type as it was discussed and pointing out the advantages of each. He advised producers to boost this type of floor in order to increase sales of crushed stone.

L. C. Bonnell, of F. R. Upton, Inc., Newark, N. J., then discussed "The Importance of Proper Specifications for Crushed Stone." This talk was followed by an animated discussion led by A. B. Rodes of the Franklin Limestone Company, Nashville, Tenn.

M. L. Jacobs, of the Bethlehem Mines Corporation, Bethlehem, Pa., read a paper on "Stone Sand —Its Successful Use and Characteristics." He endorsed the use of limestone sand for concrete work and cited many test results and instances in which greater strength was secured than with ordinary sand. Several samples of advertising literature published by the company to promote the use of stone sand were displayed.

This paper created considerable discussion which was led by Dr. H. F. Kriege, France Stone Company Laboratory, of Toledo, O. He also gave some of the experiences of his company in producing this new form of crushed stone aggregate.

The report of the committee on "Ballast," prepared by E. J. Krause, chairman, who was not present, was read by William T. Kieffer of the Columbia Quarries Company, St. Louis, Mo. This report was lengthy and proved that this committee has made a broad study and conducted research of technical as well as practical value.

Col. E. J. McMahon, executive secretary of the St. Louis Quarrymen's Association, discussed the value of "Group Advertising to Promote Sales," and described a campaign of this type conducted by his association which was effective in bringing St. Louis building construction out from a bad slump late in 1929.

D. W. Saffel, Greer Limestone Company, of Morgantown, W. Va., then read a paper on "Individual Advertising" in which he described a successful campaign recently carried out by his company. He advocated circularization for best results in this type of advertising.

C. A. Munson, New Haven Trap Rock Company, New Haven, Conn., described group advertising programs which have been carried out by various industries with great success and recommended that the association conduct a campaign of this type. He then led a discussion of this subject in which all present participated.

Trade Practice Committee

On Tuesday afternoon, while the regular convention meetings were in session, the Trade Practice Committee met to consider the views and suggestions of association members. The opinions expressed disclosed differing viwpoints on the advisability, not to say expediency, of accepting the committee's resolutions as drafted, but the opposing views were not irreconcilable, as everyone present appeared to be interested in anything which could be to the advantage of the industry as a whole.

Otho M. Graves, the committee's chairman; H. E. Bair, of the France Stone Co., Toledo, O.; T. J. Weston, of Weston & Brooker, Columbia, S. C.; H. E. Rodes, of the Franklin Limestone Co., Nashville, Tenn.; I. W. Wortman, of the North Jersey Quarry Co., Morristown, N. J.; John Rice, of the General Crushed Stone Co., Easton, Pa.; James Savage, of the Buffalo Crushed Stone Co., Buffalo, N. Y.; Harold Williams, attorney, Boston, Mass.; and Mr. Fowler, of the U. S. Chamber of Commerce, Washington, D. C., were among those who took part in the discussion. Mr. Graves reported on the committee's action at the afternoon session on Wednesday.

The Pennsylvania Stone Producers' Association held a dinner meeting Tuesday evening. F. T. Gucker, of the John T. Dyer Quarries Company, Norristown, Pa., president of this association, presided and, after the dinner, introduced Fritz Haver,

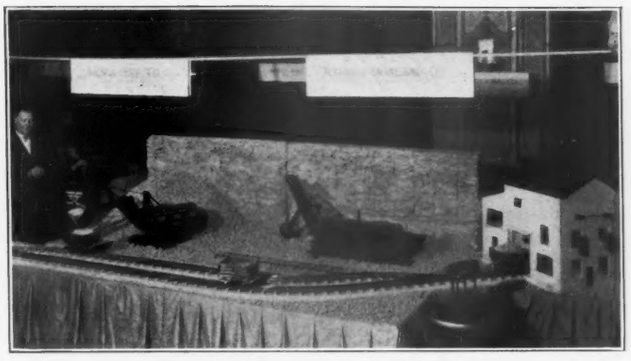


Exhibit by Bucyrus-Erie Co. and Woodford Engineering Co. at National Crushed Stone Exposition, Cincinnati, O.

of Oelde, Westfalen, Germany, who is making an extended tour of this country studying the methods used in the crushed-stone industry.

A. T. Goldbeck, engineering director of the National Crushed Stone Association, then discussed the state slag specifications in Pennsylvania and presented copies of a report prepared by him on this subject.

There was a good attendance at the Cincinnati convention of operators who belong also to the New York Crushed Stone Association. On the evening of January 21, all of these men were guests of the Allis-Chalmers Company at an elaborate dinner on the mezzanine of the Gibson Hotel. Afterward the delegates repaired to a private room where they held a meeting of their own, John H. Odenbach, president in the chair, and A. S. Owens, secretary serving in his usual capacity.

F. H. Jackson, senior testing engineer, U. S. Bureau of Public Roads, Washington, explained, among other things, the test road that the bureau has constructed at Arlington, Va. This is in the nature of an experiment predicated upon the theory that, by close sizing of the aggregate into several grades and the proportional blending of these grades at the time of mixing, a very durable and strong concrete can be made using the present proportion of cement but containing a considerably greater percentage of stone than is commonly used. Blending should never be done at the producer's plant but the several grades should be shipped and stocked separately.

The engineer-director of the American Road Builders Association came directly from that association's annual convention to address the stone crushers. Chas. M. Upham spoke upon the year's prospects for road building in the country at large. He stressed the interest that must be given henceforth to the building of county roads. The peak has been reached in the construction of the main federal and state highways, but the so-called county or secondary roads vastly outnumber these in mileage. There are, however, many angles to be studied concerning the building of any county road.

(*Continued on page* 61)

Road Show and Convention of Increasing Interest to Material Producers

Atlantic City Gathering Brings Closer Alliance of All Concerned in Big Road Building Program

THE economic welfare of most of the readers of PIT AND QUARRY is linked inseparably with street and highway construction. With some of them the sale of aggregates for this purpose is practically their sole source of revenue, while there is scarcely a man among them who does not contact this branch of construction in some way.

It is, therefore, not to be wondered at that on visiting the Road Show, and the convention of the American Road Builders' Association, at Atlantic City in mid-January, we saw many of the old faces once so familiar in the cement and mineral aggregate industries. They were there to measure the shadows of coming events—to take note of the trends in road building, to learn what the engineers had to say about materials, and to see at the show the new and more efficient devices which the manufacturers had to offer them. They were welcomed, too, and A. T. Goldbeck, director of engineering of the National Crushed Stone Association, was made chairman of one of the important sessions. But for the benefit of the many who were not there, we shall try to review the points which will be of particular interest to PIT AND QUARRY readers.

The gathering was considered of sufficient importance to command the attendance of Hon. Morgan F. Larson, governor of New Jersey, who was introduced at the opening session by Maj. Frederic A. Reimer of East Orange, N. J., president of the American Road Builders' Association. The Governor gave the visitors a warm welcome to one of the foremost road building and material producing states.

But it was Capt. H. C. Whitehurst of Washington, D. C., who put into suitable language the spirit of cooperation of all interests which is coming about in road building. In part he said:

"The ultimate success of committee investigations is largely dependent upon the active support and cooperation of those interested, who in turn receive the benefit of the valuable information as it becomes available. The active participation in committee work and in the discussion of committee reports is a duty every city official owes the profession, the city he represents, and himself.

"City officials should take advantage of the opportunity offered by this association to meet with manufacturers, contractors, and officials to learn of new developments and practices in the highway field. My attention was recently directed by the head of a large manufacturing concern to the apparent lack of cooperation between the city official and the manufacturer. He very vividly contrasted this condition with that existing between manufacturers and industrial concerns. In the latter he stated there was a free and open discussion of problems, without evidence of reserve on the part of either the manufacturer or industrial representative, which leads to the development and production of equipment and materials beneficial to all parties.

"The value of discussing the problems of equipment, materials and methods employed in highway work with representatives of manufacturers and contractors must have occurred to you. They are in a position to keep you informed of new developments and practices through knowledge gained from a wide and varying source. You likewise can be of value to the manufacturer by making known your requirements and problems. I have noticed that in most cases in recent years, manufacturers and others are contacting the officials controlling public work with representatives having technical qualifications, competent to keep you thoroughly informed on practices and developments in their respective lines. Personally, I never lose any opportunity to talk with these men, freely discussing my problems and it is seldom that some information of value is not gained through the contact. It is my belief that to develop efficient and economical equipment, methods, and materials the cooperation of manufacturers and users is essential and necessary."

An Increasing Road Expenditure

Just about a round $100,000,000 will be the increase of state highway expenditures for 1930 over 1929, according to C. R. Thomas of Chicago in his analysis of the present situation before the convention. And for a grand total of county, state and city expenditures for the year, based on past experience and all available data, he has arrived at a figure of $2,500,000,000.

As an indication of present inadequacy of highways, he quoted Roger Babson as saying that in the past five years the number of automobiles on the roads has increased about 40 per cent, while the amount of road building has increased only 13 per cent.

As coordinating with general business conditions, Mr. Thomas said:

"In discussing prosperity as affected by the 1930 highway program of road construction in states and counties, it is well to bear in mind that the income for road construction is but little affected by business conditions, because road funds are derived from taxes, which are levied and paid irrespective of business depression or inflation. In fact, during the past two years, when business conditions have been exceptionally good, there has been a decrease of funds available for road building because of the high price of money and the difficulty of selling municipal, state and county bonds offering a comparatively low but safe return.

"Low money rates are again with us and bonds have become an attractive investment. This fact is perhaps the most important factor in any prediction as to the extent of

road building in 1930. With a good market for bonds we may confidently expect that such securities will be issued for road building projects that have been held up for the past two years. As a matter of fact, during the past two years motor vehicles have increased (5,000,000 in 1929), while road facilities have not shown a proportionate increase. We must begin to catch up with our highway facilities, otherwise the motor vehicle industry, a basic industry, will suffer.

"The tendency to pay more attention to secondary roads is shown by concrete evidence in the fact that beginning this month all but seven of the states will be giving part of the gasoline tax to the counties. Additional evidence of this interest is found in the appeal of President Hoover to Congress to provide adequately for secondary roads. This development will give added impetus to the work of counties."

Mr. Thomas also showed that road activity was squarely in line with the Hoover plan for general and widespread employment, saying:

"Construction programs as affecting employment are of importance because of the number of people affected. Estimating that an expenditure of $5,000 gives employment to one man, the $2,000,000,000 program of 1929 gave employment to some 400,000 men engaged in the actual construction and maintenance of roads. In addition, the production of between $50,000,000 and $100,000,000 in road machinery and special devices for road building kept many thousands of men employed in factories. A large part of the crushed stone and the portland cement industry is dependent on the building of highways. Asphalt, a by-product in the production of gasoline, is extensively used for roads. The sand and gravel business alone employs many more thousands. There are many other materials that find a use in road building and in the manufacture of which many people find gainful employment."

Paul L. Griffiths of Pittsburgh, president of the manufacturers' division of the association, was also firm in the belief that the recent stock market slump will not affect manufacturing or road building.

"If anything," he said, "it will have a sobering effect and will result in greater application to the business of increasing production."

Even Aviators Must Have Good Roads

How odd it seems, on first thought, that road builders should, as an organized group, be interested in travel by air! Yet all our modern activities are so correlated that it happens one of the most exhaustive reports of the convention was by the committee on municipal airports.

Why? There are two reasons, and they can be given in the words of W. A. Hardenbergh of New York in his discussion before the convention:

"*Paving:* Increased traffic and the heavier transport types of planes being put into service is now resulting in a marked demand for paved runways. These are needed so that shorter take-offs will be possible; also the air-traveling public demands better landings and take-offs. Paved runways for the airport should be at least 100 feet in width, and the minimum length under most conditions is 2,500 feet. Paving such a runway requires in the neighborhood of 28,000 square yards of paving, and where two or more runways are to be paved this amount will be increased accordingly. At Port Columbus, Ohio, asphalt on a concrete base was used, and the cost for two runways, totaling over 90,000 square yards of pavement, was $135,000.

"*Other Construction:* A heavy traffic high-speed type highway is generally a requisite for communication between the airport and the city it serves. Frequently it is more economical to build such a road than to locate an airport near an established good road, where land prices may be high or where the road already carries maximum traffic. Provision for parking automobiles should be provided, dependent upon the size of the city and traffic past the port. A recent tendency is to provide recreation facilities, such as tennis courts and swimming pools at airports."

Mr. Hardenbergh said that

"Airports to be constructed in 1930, numbering nearly 1,400, will exceed by 50 per cent the number constructed last year. In volume of work such new construction will be considerably greater. In addition to the work resulting from new airports, there will be a large amount of work necessitated by improvements to existing airports, such as paving, water and sewerage, drainage and improved lighting and housing, all of which will be materially greater than that of 1929."

The uncertain factor in the airport situation is that the landing force imparted to airport surfaces by aircraft is as yet undetermined, and until data on this point can be secured, design cannot be standardized.

Pavement Design and Construction

The reports on design and construction were made by two separate committees, one for city pavements and one for county highways. The city pavement report was based on a survey made of the practice in a large number of cities. As to be expected, one of the first things commented upon is the lamentable lack of uniformity or standardization in specifications. Says the report:

"Standardization and simplification of paving specifications should be of great benefit to the manufacturers and producers of paving materials and machinery. Why should producers of crushed stone or gravel have to make a dozen grading when one or two would serve the paving industry, or why should the asphalt industry have to produce so many different materials to be used for the same purpose?

"It is probably true that the specifications of most cities are built up as a result of the paving practice of that city, modified by ideas gathered from the many so-called standard specifications which come in the daily mail of every city engineer. This is liable to lead to even greater confusion. Standard specifications can only be written after studying the requirements of many cities and the products offered by many manufacturers. Specifications to be standard must be universally acceptable. It is probably true that specifications for the materials of construction are gradually being made to conform to some model which is universally recognized as a standard throughout the country."

With regard to testing of materials the report says:

"Almost two-thirds of the cities surveyed, test all of the materials of construction. Many more cities do some test-

W. A. Van Duzer, president of A. R. B. A. for 1930

ing, while a few do none. Sixty per cent of the surveyed cities have their own testing laboratories.

"All of the surveyed cities report that recognized standard methods of testing are used, especially those of the American Society for Testing Materials. Some of the laboratories are equipped so that tests are made only on sand and cement with the melting point, ductility, and penetration of asphalts also determined. Other laboratories, better equipped—about one-third of the total number—also make standard tests on stone and other concrete aggregates, together with the determination of the compressive strength of concrete."

The design and testing of concrete is covered in a lengthy section, from which we quote:

"About one-half of the city paving engineers attempt to base their aggregate proportions for concrete on laboratory gradings, and three more report that they partially use this method. Several engineers claiming to use this method of proportioning still have fixed proportions in their specifications and include no provisions for any modification based on the aggregate grading.

"In order to insure that only cement meeting the specifications will be used five cities require that the bags shall be stamped or tagged when the cement is sampled. About an equal number of cities require the use of specially tested cement. The other cities in the survey depend upon the use of standard brands of cement with occasional check testing. Cement meeting the standard specifications of the American Society for Testing Materials is now so universally and uniformly made that the routine testing of standard brands by the city laboratory hardly seem necessary.

"High early strength cements apparently are not yet very generally used. Only nine cities report having written specifications for their use, three by mentioning the names of the brands and six by including requirements for tensile strength of briquettes at ages of one and two days. The American Society for Testing Materials is now working on a new specification for High Early Strength portland cement in which a strength of 275 pounds per square inch is specified at one day and 375 pounds at three days and not less than 375 pounds per square inch at 28 days when the test is made on standard 1 to 3 mortar briquettes."

Central Mixing Plants

Central mixed concrete is used in eighteen of the cities surveyed by the committee, and it is stated that in almost every city a higher strength concrete is secured than when the materials are mixed on the street. Other advantages such as greater uniformity, better mixing and easier control of the proportions are reported. A part of the increased strength, it is pointed out, may be attributable to the use of a smaller amount of mixing water, and more thorough mixing. The characteristics of the sand used seems to have considerable to do with the transportability of the concrete. Sands from which the very fine particles have been removed do not produce a concrete which can be transported without a separation of the water.

Highway Design and Construction

The county highway committee on design and construction made the following among its recommendations:

"That the weight measurement of aggregates and water should be used so as to obtain more uniform concrete.

"That no better curing method has been devised than the 16-hour wet burlap followed by the 10-day wet-earth blanket.

"That the water-cement ratio, for the selected materials, should be maintained as low as will permit the reasonable workability of the concrete.

"That the flexural tests of concrete beams and the compression tests of drilled cores make possible better control of the construction operations.

"That the irregularities in the finished surface should not exceed a departure of ¼ in. from a 10-ft. straight edge and the trend is toward a maximum of ⅛ in.

"That flexural tests, such as the modulus of rupture of concrete beams, are more logical than the compression tests of cylinders, because concrete pavements fail first in tension and flexure.

"That, because of the waste of material, specifications should not provide for the gap grading of coarse aggregates whereby the intermediate sizes are omitted so as to decrease the percentage of voids, since the omission of all intermediate material up to 30 or 40 per cent of the total will only reduce the total voids 1 or 2 per cent.

"That so-called high-early-strength cements, where the constituents are kept secret by the manufacturers should not be approved until long-time tests have determined their durability.

"That acceptable special cements must fulfill the definition for portland cement, and that the early acceleration of the set shall be obtained only by more careful blending, more complete grinding of the raw material, and more thorough burning."

Traffic Bound Roads

It was recognized by the sub-committee on "Untreated Surfaces," as well as by the other committees and the convention in general, that any improvement work done on subsidiary roads should be such as to serve as a base for more permanent improvement later. It has come to be generally recognized that every improvement is a "traffic breeder" and that it is unsafe to assume that any road is not sufficiently in the main line of travel to justify improvement.

Materials recommended as adaptable and suitable for untreated surfaces and which can be improved later by the addition of other types of surfacing include stone, slag, gravel, lime rock, marl, caliche, chert, shale, disintegrated granite, sand, clay and volcanic cinders. The committee further states:

"Fine crushed rock and gravel roads have been built extensively since the war in all parts of the country, particularly in the West and Middle-West. They differ from the waterbound macadam formerly in vogue not only in the smaller size of aggregate used, but in the variety of materials utilized and to secure a compacted thickness of road metal, the use of the drag or grader under traffic rather than a road roller. Under constant and intelligent maintenance these roads present a much smoother surface than was formerly the case.

"The term traffic bound roads is most often used to designate such surfaces. A maximum size of 1½ in. is generally used for first course and material passing a 1 in. or ¾ in. opening for the top. The method of building generally used is to spread from trucks on the prepared grade, spread with a blade grader, leaving not over two inches of loose material on the traveled way, and the surplus in windrows along the sides. These piles along the sides form a storage which is gradually dragged in as traffic compacts the thin layers. Thus a dense compact surface is secured from the very bottom up."

Better Materials for Subgrades and Bases

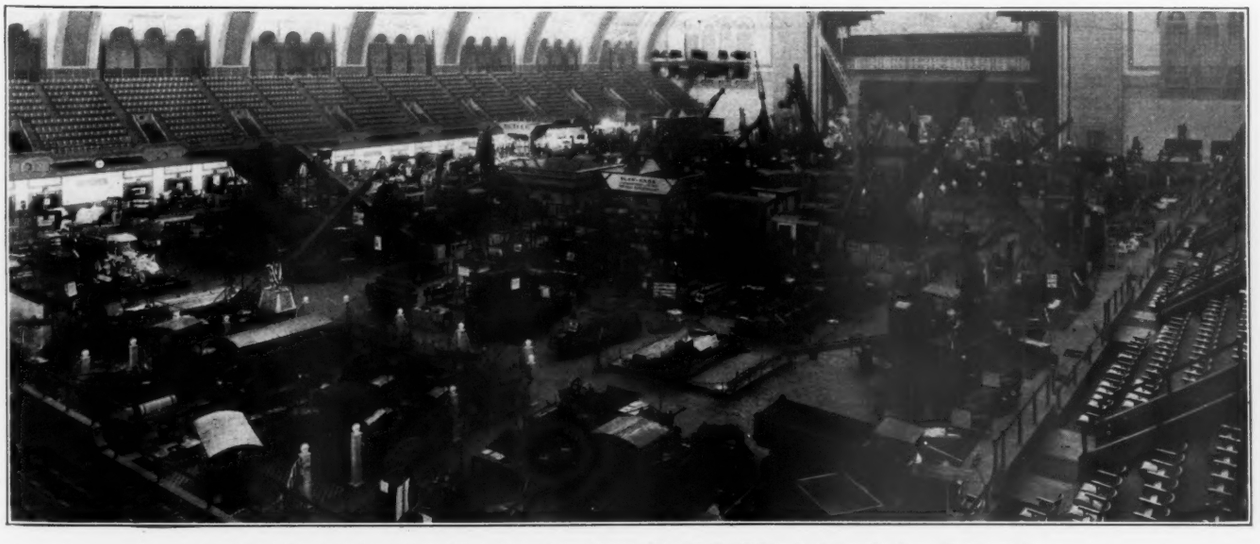
One of the most voluminous reports of the convention was made by the committee on "Subgrades and Pavement Bases." And it should give comfort to the material producers, for it advocates the better construction of these parts of the roadway. Regarding sand as a subgrade, alone or in combination with clay, the report states:

"Pure, coarse grained, angular sands in contrast, sizes being from .05 mm. to 0.1 mm., when laterally confined and relieved of extremely high concentrated load, represents one of the best and most stable subgrades which exist. Sand has high internal friction due to the interlocking of angular soil grains. The more angular, or as we usually say, the sharper the sand the higher will be its internal friction. A sand having rounded grains has very low internal friction and therefore would offer a low supporting value. Fine round grained sand subgrades in West Palm Beach and Miami, Florida, showed a decided loss of support in the presence of high ground water as compared to the coarser sands. Sand has no cohesion, no plasticity, is porous, permeable and if coarse, does not break down when wet, but rather is improved in bearing power to a certain point on absorbing moisture. Sand has no capillary attraction and has high intensity and uniformity of support. If sands are manipulated when slightly damp, the phenomenon of bulking is exhibited, but on drying or gaining more water, the sand assumes its original volume. In this case the sand grains having been separated mechanically are held apart temporarily by the surface tension of the water particles. Although important in the measurement of fine aggregates, this property is not significant as a subgrade characteristic. Being non-capillary and freely drained, it is not conducive to frost heaving, such water as is present forming ice at freezing temperatures or slightly below. Thus the heave is infinitesimal in size and when the ice thaws, the water is drained as fast as it forms. Sand, having no cohesion, has no tensile strength and will move materially if not confined, but having internal friction its stability and bearing power is increased by outside pressure."

Materials Must Be Carefully Weighed

The close attention being given to materials for highway work is reflected in a report presented by a committee on "Standardization of Weighing

(*Continued on page* 57)



Exhibition Hall, Atlantic City, American Road Builders' Association Convention

First 1930 Regional Cement Safety Meeting Held January 22 at Birmingham

THE first meeting of the 1930 regional safety series, conducted by the Portland Cement Association, was held Wednesday, Jan. 22, at the Hotel Tutweiler at Birmingham, Ala. This is the fourth consecutive year the cement mills of the Southeastern section of the country have gathered to discuss accident prevention and the meeting was a greater success than any previous gathering.

The morning session began at 10 o'clock in the assembly hall of the Tutweiler, with H. O. Underhill, superintendent of the Alpha Portland Cement Co. wielding the gavel as chairman. A. J. R. Curtis, assistant to the general manager, Portland Cement Association, opened the meeting with a report of accident statistics in the cement industry for 1929. The report showed accident frequency has been greatly reduced although fatal accidents continue to be an important problem, more fatalities having occurred last year than have been recorded for some time past. The remainder of the morning session was taken up by the following program:

Address—"Safety, Now and Then"—Dr. James S. Thomas, Director, Extension Division, University of Alabama.

Address—"The Benefits Other Alabama Industries Derive from the Well Organized and Functioning Safety Work of the Portland Cement Association"—R. M. Thigpen, Workmen's Compensation Clerk, State of Alabama.

Address—"Safety and Cement"— S. F. Clabaugh, President Protective Life Insurance Company.

At 12:30 p. m., a recess was taken for luncheon, which was served in one of the private dining rooms, Felix Guenther, general superintendent of Pennsylvania-Dixie Cement Corp., acting as toastmaster in his usual inimitable style. The luncheon, which was thoroughly enjoyed by the delegates, was followed by a talk entitled, "Apropos" by T. G. Brobston, superintendent of transportation of the Birmingham Electric Co. Mr. Brobston discussed safety problems as applied to the power industry and those present were able to draw close parallels to the accident prevention problems met with in the cement industry from his enlightening discourse.

The session was resumed at 2 o'clock in the assembly hall, with W. M. Cabaniss, superintendent, Lone Star Cement Co., Alabama, in the chair. After reading a number of Safe Practice Pamphlets distributed by the National Safety council, followed by a discussion of the points brought out in the pamphlets, the remainder of the afternoon was given over to a first-aid team contest, which was won by the team representing the Birmingham plant of the Alpha Portland Cement Co. A handsome cup went to the winners. The Birmingham plant team of the Lehigh Portland Cement Co. finished second, while the Richard City, Tenn., plant of the Pennsylvania Dixie Cement Corp. placed third.

The fourth annual safety banquet was held at 7 p. m. in the ball room of the hotel. The toastmaster, R. H. MacFetridge, superintendent, Lehigh Portland Cement Co., kept the banqueters in a merry mood with his quips and original jokes. Mark Small, district engineer in charge of the Birmingham office of the Portland Cement Association, led the diners in group singing. One of the numbers, which proved to be a favorite, was the following, sung to the tune of "The Old Grey Mare":

The accident list, it ain't what it used to be
Ain't what it used to be, ain't what it used to be
The accident list, it ain't what it used to be
Many long years ago.

Many long years ago, many long years ago,
The accident list it ain't what it used to be,
Ain't what it used to be, ain't what it used to be
The accident list, it ain't what it used to be,
Many long years ago.

John Temple Graves, well-known journalist on the staff of the *Birmingham Age-Herald* gave a talk on "Roads and Prosperity." Another banquet address was by Maj. Henry A. Reninger, safety director of the Lehigh Portland Cement Co. Major Reninger, who has long been prominent in safety work in the cement industry, recently completed his term as president of the National Safety Council.

Attendance totalled 128, exceeding any previous enrollment of the mills in this group. The following plants were represented:

Company	Plant
Alpha Portland Cement Co	Birmingham, Ala.
Cumberland Portland Cement Co	Cowan, Tenn.
Lehigh Portland Cement Co	Birmingham, Ala.
Lone Star Cement Co., Alabama	Birmingham, Ala.
Lone Star Cement Co., Alabama	Spocari, Ala.
Lone Star Cement Co., Louisiana	New Orleans, La.
National Cement Co	Ragland, Ala.
Pennsylvania-Dixie Cement Corp	Kingsport, Tenn.
Pennsylvania-Dixie Cement Corp	Clinchfield, Ga.
Pennsylvania-Dixie Cement Corp	Richard City, Tenn.
Universal-Atlas Cement Co	Leeds, Ala.

The next regional safety meeting on the 1930 schedule will be held Tuesday, Feb. 4 in the Baker hotel at Dallas, Tex., when representatives of Texas cement plants will be present. L. R. Ferguson, vice-president, Lone Star Cement Co., Texas, will be the chairman.

American Road Builders Secured Ample Capacity for Enlarged Program and Exhibits

THE Twenty-Seventh Annual Road Show was the best to date insofar as abundance of space was concerned. The new mammoth Atlantic City Auditorium has two full floors of exhibit space and a balcony for overflow. This made it possible for exhibitors to have practically all the space they wanted, resulting in larger lines of equipment, more full-size machines, better demonstration facilities, and more room for the accommodation of visitors, than any similar show of the past.

It is perhaps for this reason that the superficial observer jumped to the conclusion that the attendance was not as great as at some previous shows. But the fact was that there was more room for everybody, there was no crowding, there were no points of undue density, and so the attendance was in many cases misjudged. Only by checking up on the registration figures was one able to get a true line on the actual attendance.

It was noted by some of the exhibitors, too, that Atlantic City seemed to have a pulling power for the men higher up—the executives, the men who decide things, who determine what and when new equipment shall be bought.

It was of material advantage to have the entire gathering under one roof—convention sessions, committee meetings, and show. Following are brief comments on some of the exhibits which were of particular interest to readers of PIT AND QUARRY.

Allis-Chalmers Manufacturing Company, Milwaukee—This exhibit featured two new tractors now being made by this company, the Monarch 35, a track type tractor, and the Allis-Chalmers united wheel tractor. One of the outstanding features of the latter is fourth speed forward, which comes as standard equipment. The Monarch 35 made its first appearance at this time. It is similar in design and construction to the 75 and 50 of the Monarch line.

American Hoist and Derrick Company, St. Paul—This company exhibited an American Gopher gasoline-operated 1-yd. combination shovel-crane and dragline, so powered as to permit of demonstrating all operations except the swing.

Barber-Greene Company, Aurora, Ill.—Model 57 belt feeder, Style N portable belt conveyor, and the new 30-in. belt conveyor which is now first shown. Moving pictures and transparencies added to the interest of the exhibit. W. B. Green, W. A. Buell and J. Turner were in attendance.

C. O. Bartlett & Snow Company, Cleveland, O.—Demonstrations of movable V dump bodies for various purposes, including transporting of mixed concrete and aggregates.

Brookville Locomotive Company, Brookville, Pa.—Gasoline locomotives for pit and quarry work. Demonstrated by B. Eisenman, general manager.

Butler Bin Company, Waukesha, Wis.—The sample Butler bin loomed up as one of the prominent features of the show. Measuring hoppers were also shown. Morgan Butler, C. E. Riblet and A. R. Morton represented the company.

Buda Company, Harvey, Ill.—Demonstrating the advantages of Buda-M.A.N. diesel engines for a variety of power purposes.

Burch Corporation, Crestline, O.—Working model of the Burch unloader, showing its simplicity and ease of operation.

Byers Machine Company, Ravenna, O.—Three complete Byers full-swing excavators on the floor, in ½-yd., ¾-yd. and 1-yd. sizes, the latter being the latest addition to the line.

Chain Belt Company, Milwaukee—This display was divided in two parts, one for the construction equipment division and the other for the chain division and affiliated companies. The former of these showed Rex mixer pumps saw rigs and elevators. The second exhibit comprised chains, transmissions, belt conveyors and castings.

Chisholm-Moore Hoist Corporation, Tonawanda, N. Y.—Cyclone chain hoist in a number of different types.

Climax Engineering Company, Clinton, Iowa—Two outstanding models of the Blue Streak line of engines were shown. E. F. Deacon, president of the company, was in attendance, and Messrs. Keeling, Reiner, Strotein and Twombley.

Commercial Shearing and Stamping Company, Youngstown, O.—An exhibit of the new Model F three-way and rear-dump bodies. These bodies were also seen on various trucks throughout the exhibition hall.

Diamond Iron Works Inc., Minneapolis—A complete working model of the Diamond double unit portable screening and crushing plant.

Dodge Bros. Corporation, Detroit—Several construction and material handling bodies on the 3-ton chassis.

Domestic Engine and Pump Company, Shippensburg, Pa.—A line of pumps for use by contractors and material men for dewatering and for water supply.

S. Flory Manufacturing Company, Bangor, Pa.—Demonstrating one of the gasoline-driven Flor-Ox hoists, which can be adapted to either construction or drag-scraper work. W. A. Flory in charge.

Four-Wheel Drive Auto Company, Clintonville, Wis.—This company had on exhibition two of the 1930 models of the FWD trucks.

Fuller Company, Catasauqua, Pa.—Showing the application of the Fuller-Kinyon conveying system to the handling of bulk cement in road construction. George Engelhart in charge.

Galion Iron Works and Manufacturing Company., Galion, O.—Demonstrating the Jeffrey-Bakstad jaw crusher, which makes a primary and two secondary reductions with one machine. It was shown in several different adaptations, and in connection with other material-handling equipment. Exhibit in charge of J. R. Bakstad.

General Excavator Company, Marion, O.—Exhibited a ½-yd. General convertible shovel. It was equipped with shovel boom assembly, which is easily converted in the field to clamshell, dragline, back hoe, crane or skimmer.

Geo. Haiss Manufacturing Company, New York—The new Haiss excavator attracted much attention, as well as the line of conveyors, buckets and other equipment made by this company. The operation of some of the devices under actual field conditions was shown by means of moving pictures. Several members of the Haiss family were in attendance, as well as others of the sales force.

Harnischfeger Corporation, Milwaukee—Three complete excavators of the P&H line were shown, together with a partially disassembled travel base of Model 700-A to show all the features of construction.

Hercules Motors Corporation, Canton, O.—Showing the adaptability of Hercules engines to material handling and road building equipment.

C. S. Johnson Company, Champaign, Ill.—Full-size Johnson batching plant, equipped for proportioning by weight as already permitted by the highway departments of many states.

Koehring Company, Milwaukee—The space occupied by this company was always well filled with visitors, taking note especially of the new No. 401 shovel, here seen by the general public for the first time. The enclosed gears running in oil, and the shafts on roller or ball bearings, made an especial appeal to the men who are familiar with this kind of equipment. The other new feature of this exhibit—the Dumptor—with its twin engines and its combined features of truck, tractor and bulldozer also attracted deserved attention.

Lee Trailer and Body Company, Chicago—Several models, mounted and in operation, of mechanical power-hoist dump bodies, and featuring a new rocker type power hoist. This latter is a mechanical motor-driven power unit designed especially for 1½-ton trucks. M. C. Lee, sales manager, in charge, assisted by other factory and sales representatives.

Lidgerwood Manufacturing Company, Elizabeth, N. J.—Demonstration of the latest types of Lidgerwood hoists, featuring especially the safety devices by which accidents are prevented in case the power fails, a fuse blows out, the operator is careless, or any other emergency. A Tugmore car puller was also shown. E. Pulsford was in charge of the exhibit.

Link-Belt Company, Chicago—This company had a large space filled with its latest types of cranes, shovels and draglines. G. H. Olson and N. A. Weston, Jr., both from the Chicago office, were in charge of the exhibit.

Manitowoc Engineering Works, Manitowoc, Wis.—Demonstration of the Moore Speedshovel, and showing by photographs of its ability to handle heavy overloads on occasion.

Marion Steam Shovel Company, Marion, O.—This company displayed and demonstrated a new dipper trip recently invented and patented by George Morin, a former practical shovel operator. Improvements on the standard Marion line of shovels were also shown.

Morris Machine Works, Baldwinsville, N. Y.—The attractive feature of this exhibit was a miniature sand pumping outfit equipped with an Eagle Swintek screen nozzle ladder. Victor J. Milkowsky of Baldwinsville and A. H. Young of Cleveland were in attendance.

Morse Chain Company, Ithaca, N. Y.—Working models of Morse drives and flexible couplings. Represented by C. L. Saunder and R. L. Phillips.

National Hoisting Engine Company, Harrison, N. J.—Double-drum gasoline hoists in 20-hp. and 35-hp. sizes. Represented by C. S. Ackley, vice-president.

Niagara Concrete Mixer Company, Buffalo, N. Y.—Full-size 3x10-ft. double-deck Niagara counter flow vibrating screen in operation. Operated by a 5-hp.-motor, which allows for a 40 per cent overload. Demonstrated by Harry Buckenheu.

Nordberg Manufacturing Company, Milwaukee—Exhibited among other equipment a full-size 4-ft. Symons cone crusher. Delbert Kay in charge.

Nugent Steel Castings Company, Chicago—Showing Nukeel alloy heat treated reversible and clincher type dipper teeth also carbon and alloy steel castings for heavy-duty machinery. Represented by W. J. Nugent and associated salesmen.

Owen Bucket Company, Cleveland, O.—Several types of Owen clam-shell buckets, one of them in simulated operation.

Pioneer Gravel Equipment Manufacturing Company, Minneapolis—A working model typical of the six types of portable crushing, screening and loading outfits made by this company.

Relay Motor Corporation, Lima, O.—This was the first public appearance of the new Relay truck, Model 50-D, shown in connection with others of the line. A motion picture showed some of the details of these trucks. W. E. Murphy was present from the Lima office, assisted by eastern representatives.

Sauerman Bros., Inc., Chicago—Complete working model of a sand and gravel plant, fed by a Sauerman dragline cableway excavator and supplemented with a Crescent scraper, each powered with a Sauerman electric power unit. Several sizes of Durolite blocks were also shown. Messrs. Tompkins, Baughman, Schultz, Nellis, Bartholomae and Gates in attendance.

Schramm, Inc., West Chester, Pa.—Air compressor exhibit in charge of A. O. Witt, manager of sales, assisted by branch managers.

Smith Engineering Works, Milwaukee—Two models in operation, one of a sand and gravel plant, with plate feeder, belt conveyor, revolving screen, sand tank and screw rewasher; the other of a stone crushing plant with primary breaker, reduction crusher, conveying equipment and heavy-duty screen. In charge of D. D. Barnes, sales manager.

Speeder Machinery Corporation, Cedar Rapids, Ia.—A large and attractive exhibit of fully convertible gasoline and electric ½-yd. shovels, including the improved Model B-3 Speeder. This machine can be used as a shovel, crane, dragline, clamshell, pullshovel, and skimmer. It has high and low speeds on drums, travel and swing, and patented two-piece independent rope swing. The representation was headed by T. M. Deal, sales manager, and included a large number of sales representatives.

A. Streich & Bro. Company, Oshkosh, Wis.—The exhibit included a 6-yd. dump wagon trailer, featuring an automatic winding and dumping mechanism; also a pair of track laying wheels and a flexible tractor hitch. Fred Streich was the demonstrator.

Universal Crane Company, Lorain, O.—Five Universal cranes were shown including the new Universal motor truck crane. This latter can be changed rapidly from an 8-wheel rubber tired truck to a crawler tread. Allen Smythe was in charge of the exhibit.

Universal Crusher Company, Cedar Rapids, Ia.—In addition to the well-known models of crushers made by this company, a new model was shown for the first time. This is a 5x48-in., designed primarily as a reduction crusher. A portable crusher, with 22-ft. steel folding elevator, was on display. E. A. Velde was there to greet friends.

Wheeling Mold & Foundry Company, Wheeling, W. Va.—Showing a new portable crushing and elevating plant, also three sizes of standard Wheeling crushers equipped with roller bearings, alemite lubrication to toggle joints, and toggles protected by dust guards. Wm. H. Sallwasser of the crusher department in charge of exhibit.

Williams Patent Crusher and Pulverizer Company, St. Louis—Displaying a Williams Jumbo Junior, which breaks one-man stone down to 1¼ in., ¾ in. or smaller; also a model of a Williams hammer mill. Represented by Ray F. Schneider, advertising manager.

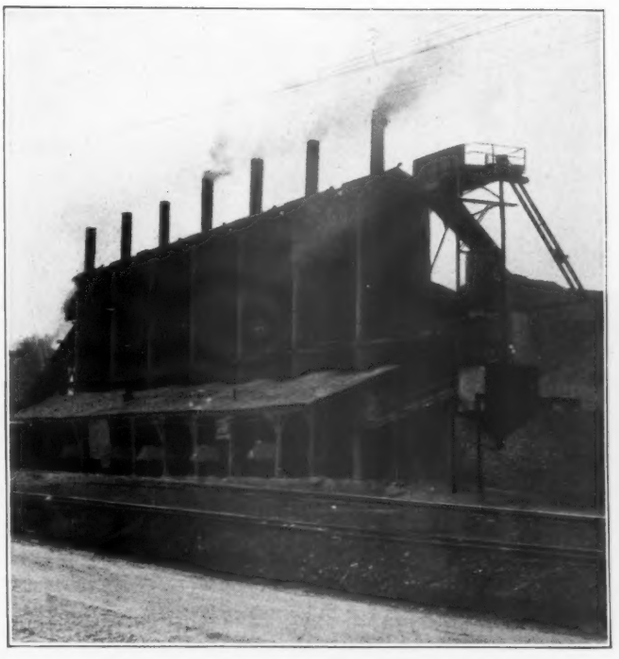
G. H. Williams Company, Erie, Pa.—New Champion series of fast-digging buckets, also a Williams trailer.

Warner Company Operates Large Four-Level Quarry at Cedar Hollow, Pa.

Lime Burned in Vertical and Rotary Kilns for Screening and Hydration

By F. A. WESTBROOK

THE Cedar Hollow lime plant of the Warner Company, a consolidation of the Charles Warner Company and the Van Sciver Corporation, at Cedar Hollow, Pa., produces lime, ballast and road-making hydrate known by the trade name of Limoid. This is an extremely large operation, comprising a quarry on four levels, part of which was formerly owned by the Van Sciver Corporation of Philadelphia, a hydrating plant and a stone-crushing plant. Over 200 men are employed.

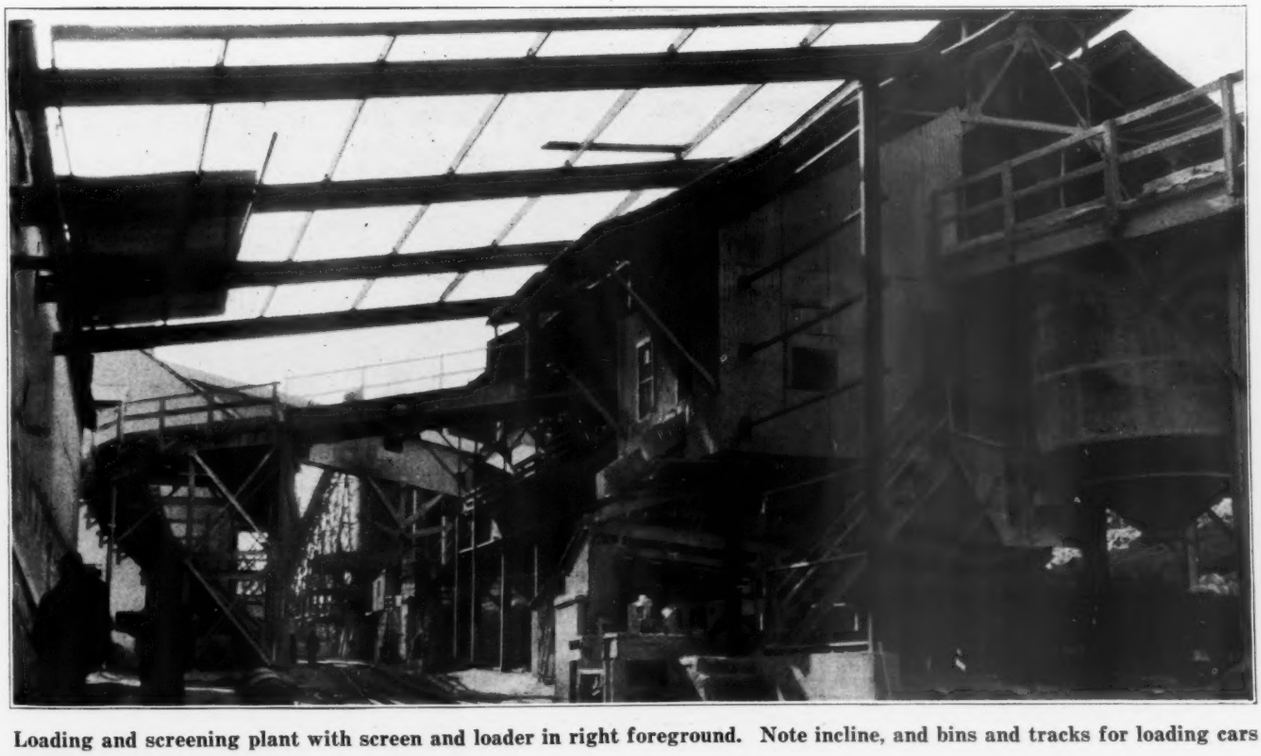


View of the seven small vertical kilns

Quarry Practice

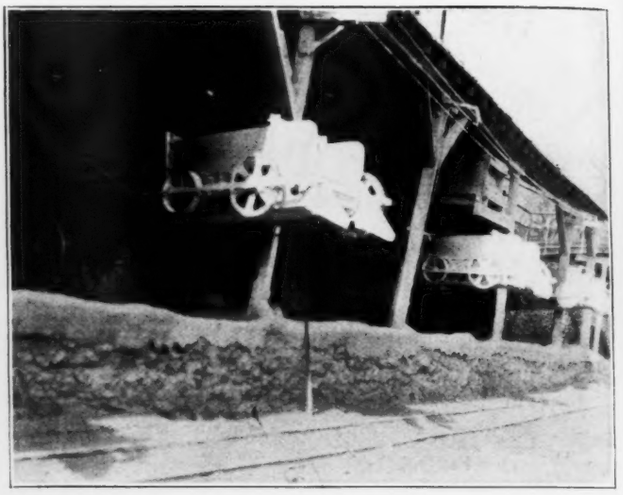
The two lower levels supply this plant while the two upper levels supply the Knickerbocker plant, two miles away, acquired from the Van Sciver Corporation.

Waugh drills are used for the snake-hole method of blasting which is mostly in vogue. Ingersoll-Rand jackhammers and Denver rock drills are used for the secondary drilling. Well drilling is not well adapted to conditions because the rock is too much broken up. Springing the holes with sev-



Loading and screening plant with screen and loader in right foreground. Note incline, and bins and tracks for loading cars

Lime storage tanks, each of 2,000 ton capacity

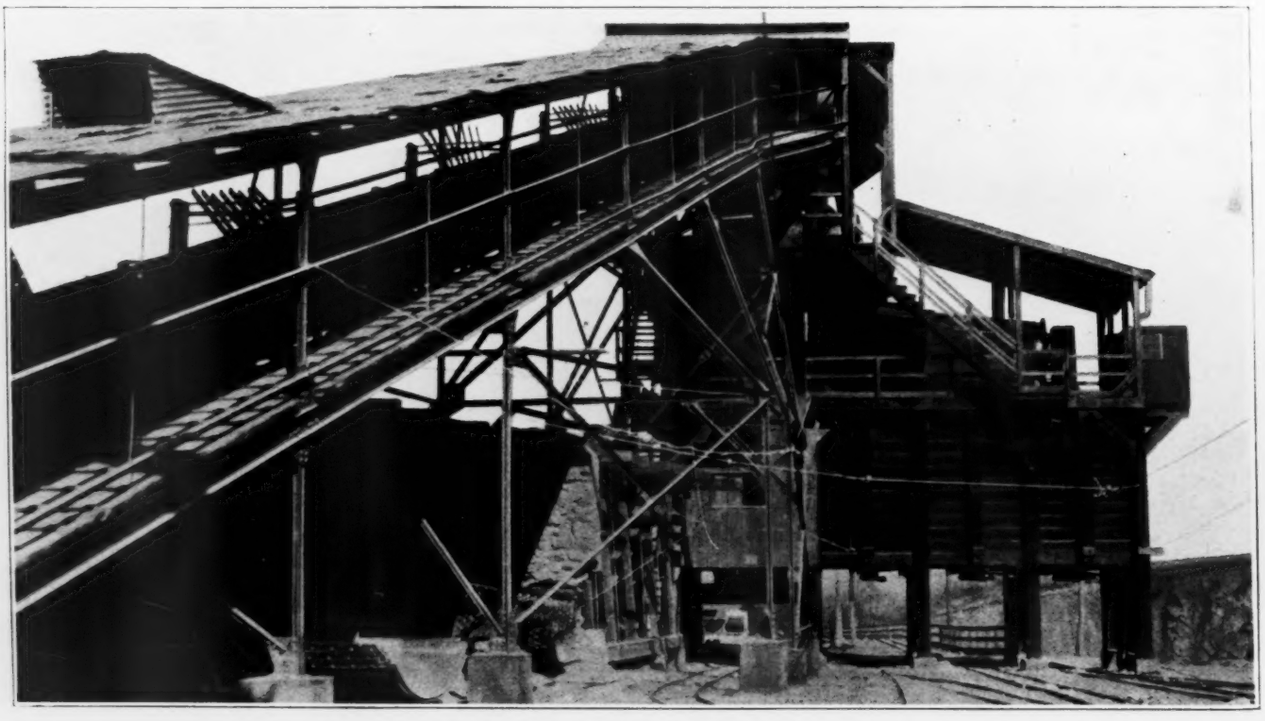


Bottom of kilns and lime conveyor

eral small shots and then blasting out has been found to be the best way to produce good kiln stone.

Stone is hauled in Koppel side-dump cars, by horses, to the foot of the incline and then to the top of the quarry by a Flory hoist with a 75-hp. Westinghouse induction motor. There are ten Flory hoists in the plant. The quarry cars are weighed on Howe scales at the top of the incline. From the top of the quarry, the cars of stone are hauled to various parts of the plant by eight 10-ton Plymouth gasoline locomotives. Near the top of the incline from the quarry is a battery of seven small Arnold & Weigel Eldred-process kilns. The stone is brought in the quarry cars to the foot of the incline by the Plymouth locomotives and hauled up to the top by a Flory hoist.

At the bottom of the kilns, the burned lime is drawn off on Link-Belt lime conveyors, directly into side-dump cars to be taken to the lime loading



Conveyor from jaw crusher to the revolving screen

Gondola cars ready for loading with stone for ballast

and separating plant. At one end of the firing level, there is a steel ash-bin into which the ashes are dumped from wheelbarrows. This bin has a spout at the bottom so that a truck for carrying away the ashes may be loaded by backing underneath it.

In addition to this battery of kilns, there is a battery of four consolidated double-fired kilns and two other separate double-fired kilns. There is also a Wood gas-producer kiln. Two electric dinky engines haul the lime from these kilns to the loading and separating plant.

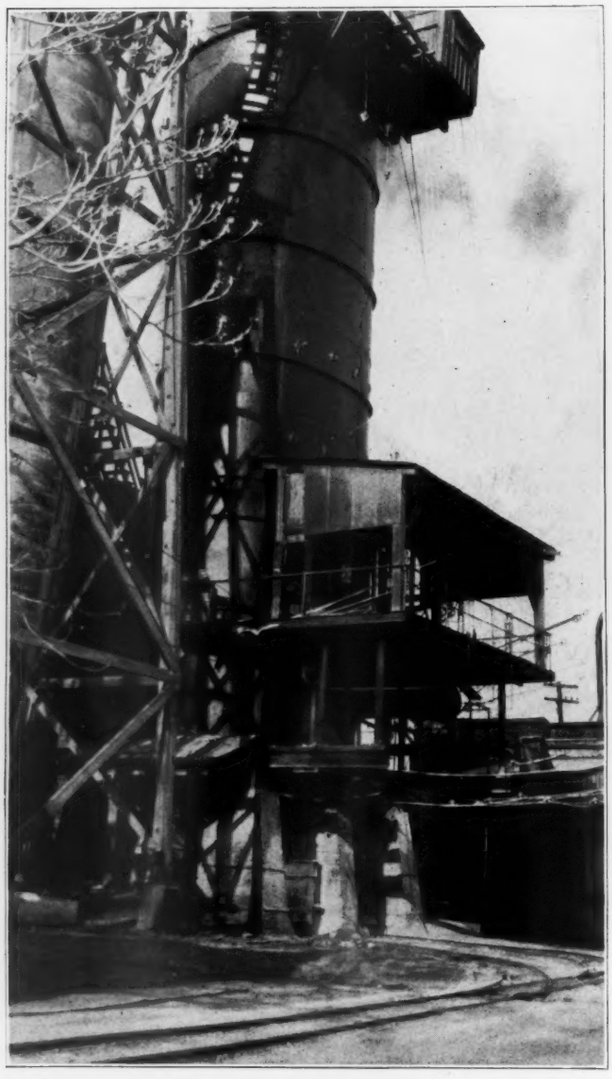
Loading and Separating Plants

The burned lime is dumped into steel bins from beneath which it is carried on a Link-Belt pan conveyor to an oscillating screen, made by the same company from designs furnished by the Warner

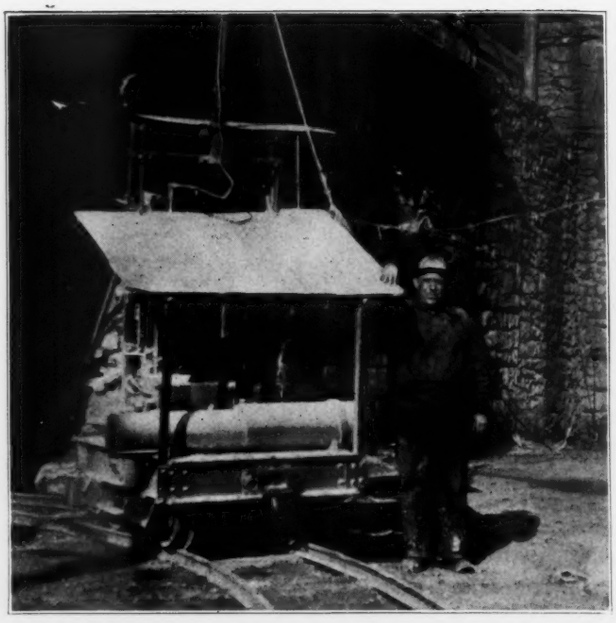
The rotary kiln

Company. The lumps pass from the screen to a Link-Belt conveyor for inspection, the cores being

Stone-crushing plant for rotary kiln at right with elevator and screen house above and conveyor leading to the kiln. In center are storage bins for oversize crushed stone. Gas-producer plant at left



Kiln fired with producer gas

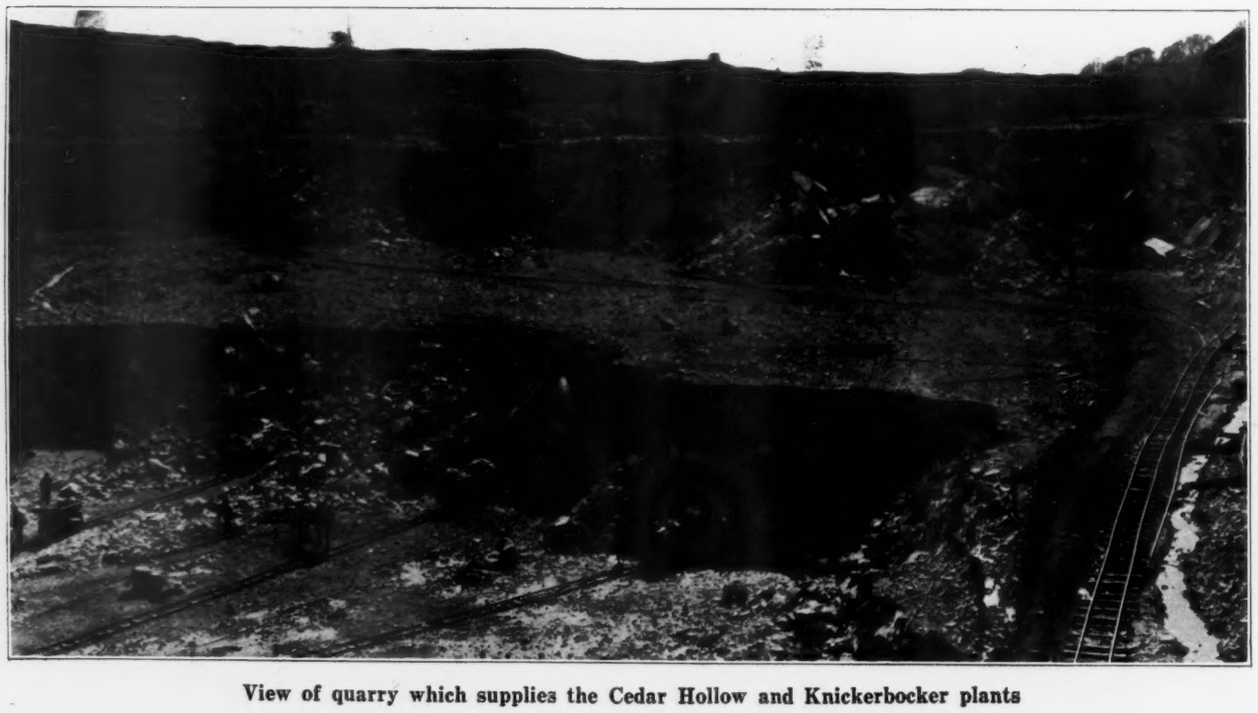


Electric dinkey for hauling lime from gas-producer kiln to separating and loading plant

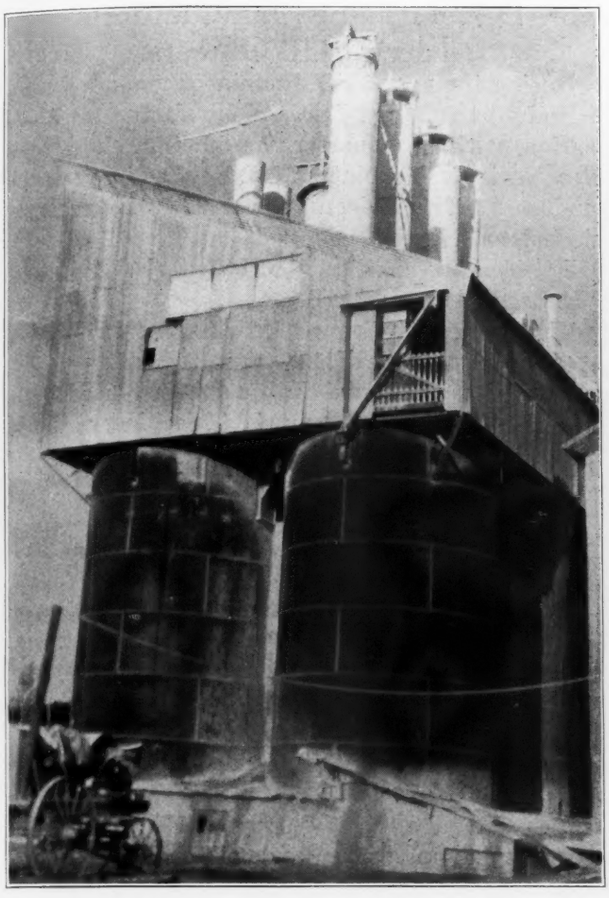
picked out and thrown into a chute leading to quarry cars. The good lumps are permitted to pass on to a Link-Belt knuckle conveyor which loads them into box-cars for bulk shipment. When in position for loading, the box-cars stand on a Howe track-scale.

The small pieces of lime which pass through the oscillating screen drop into a McLanahan crusher which prepares it for the hydrating plant. From this crusher the lime drops to a Link-Belt belt conveyor which deposits it in a storage tank.

There are two large storage tanks each having a capacity of 2,000 tons. One tank is for surplus



View of quarry which supplies the Cedar Hollow and Knickerbocker plants

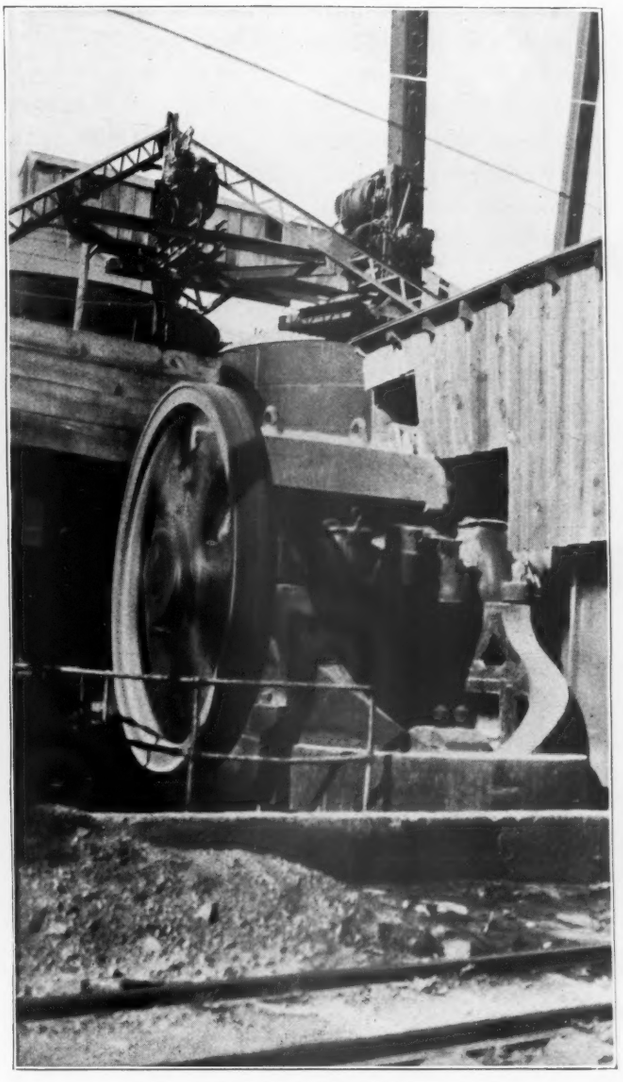


Hydrator plant with storage bins and top of elevator

lime as it comes from the kilns; the other is for crushed lime for the hydrator coming from the McLanahan crusher. The cars are hauled to the top by a Flory hoist where they are dumped into a Link-Belt belt conveyor which deposits the lime in the proper tank. It is drawn from these tanks as wanted and taken in cars either to the hydrating plant or the separating and screening plant. These tanks thus provide a means of flexibility whereby it is not necessary to stop the kilns if shipments of building lime or the demands of the hydrating plant are abated, or to stop either of the latter in case the kilns are shut down for any reason.

Rotary Kiln Plant

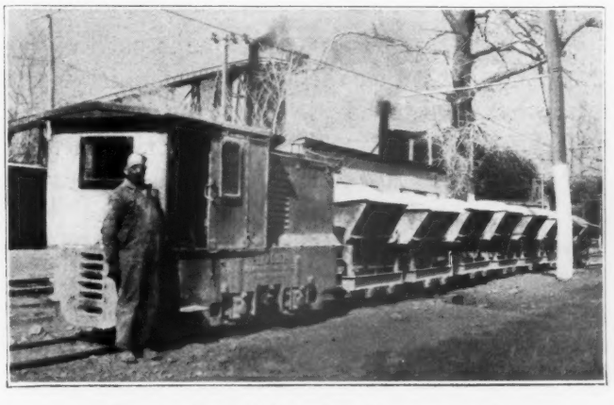
The rotary kiln is used mainly to supply lime for the hydrating plant. It is fired with a Wood gas-producer. Stone is pulled in cars up to the crusher-house where it is dumped into a Telsmith breaker. It is then elevated by a Link-Belt elevator to an Allis-Chalmers manganese-steel revolving screen. The properly reduced stone is deposited on a Link-Belt drag conveyor which takes it to the rotary kiln. The oversize stone passes through chutes in steel storage tanks whence it is drawn off and taken back to either the Telsmith breaker or the vertical kilns.



Jaw crusher in stone-crushing plant

Hydrating Plant

After being burned and passed through the cooler, the lime is conveyed by a Link-Belt pan conveyor to a K-B pulverizer, manufactured by the Illinois Stoker Company. It is then elevated to another pan conveyor which carries it to a chute leading to the Hardinge ball-mill. There is another elevator to the Clyde separator.



Locomotive with train of quarry cars

The coarse material drops back to the ball-mill through a chute, and the fine material is carried by a Link-Belt screw conveyor to an elevator leading to the storage tank for the hydrator. It is carried from this tank to the Clyde hydrator by a screw conveyor and by another screw conveyor to a tank over the tube-mill. Finally there is an elevator from the tube-mill which carries the hydrate to tanks supplying nine Bates valve-bag packers.

Burned lime for the hydrating plant—stored in the 2,000-ton tank previously mentioned—is taken as needed and dumped from cars into the K-B pulverizer and then goes through the processes just described.

Stone-Crushing Plant

The stone-crushing plant serves two purposes. One purpose is to provide stone for ballast and road-work, and the other is to make vertical-kiln

Belt conveyor from lime crusher to storage tanks for hydrator

stone. Not all of the quarry stone is put through this plant, but rather the larger sizes which would otherwise have to be broken up by hand in the quarry. The quarry cars are run upon a platform from which they are dumped into a large Traylor jaw crusher. The rock is then conveyed on a Link-Belt conveyor to the Allis-Chalmers manganese-steel revolving screen. Various sizes are deposited in bins under which cars may be loaded and there is also a chute on the other side by which stone may be loaded in railroad gondola cars for ballast.

Diesel Engine Manufacturers Elect 1930 Officers

During the year 1929, prominent manufacturers organized the Diesel Engine Manufacturers' Association, with headquarters at 30 Church Street, New York, and appointed M. J. Reed as its research engineer. The officers for 1930 were recently elected, as follows:

President—A. E. Ballin, of McIntosh & Seymour Corp., Auburn, N. Y.

Vice-president—George Codrington, of Winton Engine Co., Cleveland, O.

Executive committee chairman—E. T. Fishwick, of Worthington Pump & Machinery Corp., New York.

Technical committee chairman—H. W. Dow, of Nordberg Mfg. Co., Milwaukee, Wis.

Secretary-treasurer—H. A. Pratt, of Ingersoll-Rand Co., New York.

The association has reached agreements upon numerous engineering features which are of significance to users of diesel engines, and these are to be published soon in book-form. It has worked in cooperation with the American Society of Mechanical Engineers in the standardization of fuel oils.

A careful survey shows that diesel engines are used, not only in various kinds of power-generating plants, marine propulsion, construction work, refrigeration, food preparation, land transportation, clothing and textile manufacture, drainage, irrigation, oil pipe lines, and miscellaneous factories, but in all kinds of mines, cement mills, granite quarries, sand and gravel plants, and on gravel dredges.

A diesel engine of 15,000 hp. is in service in Europe but the largest unit in America is of 4,000 hp.

The tendency is toward lighter and higher-speed portable units. Piston speeds of 1,200 ft. per min. are common. In smaller sizes the rotative speed is close to 700 r.p.m.

Plan Permanent Building Exhibit at Moscow

A permanent building exhibit is being organized in Moscow, in connection with the large program of factory, mill, housing, and other construction, now under way in Soviet Russia, according to the Amtorg Trading Corp., 261 Fifth Ave., New York, N. Y.

Firms or individuals desiring to acquaint Soviet construction companies and engineers with their products or models, can do so by sending to the Technical Bureau of the Amtorg, two samples of each material. The samples should be rather small and easy to ship and handle.

At the exposition, all types and kinds of building, insulating and roofing materials, as well as models of original structures and details will be exhibited.

Progress of the National Crushed Stone Association As Reported by the President

By W. F. WISE

THE Thirteenth Annual Convention of the National Crushed Stone Association marks the close of another year of its operation, and it is my honor and privilege to submit to you at this time a report of the activities and finances of the Association for the year ended December 31, 1929. It is unnecessary that I make a detailed review of the various phases of our work during the past year as there is incorporated with this report, individual reports from the other officers of the Association, from the Director of the Bureau of Engineering and from the chairman of the various committees.

The statements covering the financial status of the Association included herewith have been audited by Ernst and Ernst, Certified Public Accountants, Baltimore, Md., whose certified statement will be submitted to your Auditing Committee for approval.

In view of the complete and comprehensive nature of the reports which follow, your President will make no attempt to elaborate upon them further, but, it does seem desirable to direct your attention to the following:

First, a brief reference will be made to what seems to be the more important aspects of our financial situation. Statement Number 3 indicates a "Surplus" for the general fund of $4,647.36. Statement Number 4 indicates a "Surplus" for the Laboratory Fund of $14,979.85. In this connection it should be noted that items covering the present value of Furniture and Fixtures and Laboratory Equipment have been included.

It is disappointing to have to report that our expense for the year exceeded our income by $1,752.00 as indicated in Statement Number 5. At the time of the meeting of the Executive Committee in New York on October 25, it was estimated that a deficit would exist at the end of the year of $7,058.00. To take care of this expected deficit $7,469.00 was underwritten by the various regions of the Association. When the books were closed on December 31, $4,839.00 had been received towards this deficit, leaving a balance still outstanding but definitely pledged of $2,630.00. It will be seen, therefore, that when the outstanding pledges have been received the deficit will be wiped out and a slight surplus set up with which to start the year.

Your President particularly wishes to point out, however, that the deficit will be eliminated only because a number of the members of the Association have paid in for the current year amounts over and above their regular dues. It should need no very convincing argument to demonstrate that the Association should receive sufficient revenue from its regular sources of income to meet all operating expenses, and in addition to set up a substantial reserve. To accomplish this there will be presented to your newly elected officers and Board of Directors, a budget covering the anticipated operating expenses for 1930. It is most earnestly hoped that ways and means will be devised before the close of this Convention, to assure an income for 1930 sufficient to carry out the proposed budget. Otherwise a curtailment of our activities will be necessary, an eventuality which should not even be contemplated.

W. F. Wise, re-elected president of the National Crushed Stone Association

It is gratifying to be able to report a surplus from the Cleveland Convention of $881.00 as shown in Statement Number 7, and which has been deposited in the General Fund.

In Statement Number 8, there is given a Budget Comparison for the year indicating that actual expense exceeded budget allowance by $1,526.79, but

it should be noted that included in this figure is an item of $1,337.05 for depreciation of furniture and fixtures and laboratory equipment, which was not included in the budget of operating expense approved during the year.

Therefore subtracting this figure from that shown in the statement indicates that the Association was operated during the current year within $189.74 of the operating budget approved.

Statement No. 6 shows that there is now in the laboratory fund the sum of $4,402.96. It is interesting to note that last year's statement of this fund indicated $2,066.68 outstanding as unpaid pledges, whereas from Statement No. 6 it is shown that $1,150 of this has been collected during the year, with a remainder still due of only $716.68, as shown in Statement Number 4.

Your President highly commends the excellent service which has been rendered to the Association during the past year through its standing committees and wishes to particularly direct your attention to the various reports of these committees presented by their chairmen and attached hereto.

The report of the Director of the Bureau of Engineering is most illuminating, indicating as it does the excellent work which is being accomplished through this medium for the advancement of the crushed stone industry. In this connection attention is called to a suggestion contained in the report of the Research Committee that research on bituminous materials be included as one of the activities for 1930. Your President most heartily concurs in this idea and earnestly hopes that sufficient revenue will be forthcoming this year as to permit the instigation of bituminous investigations.

Marked progress has been made during the year by the Sub-Committee for the Standardization of Commercial Sizes of Crushed Stone, a large portion of the information given being developed from a questionnaire circularized throughout the membership, and the conclusions derived from the replies to this questionnaire are most interesting. This report should be given the studious attention of every member of the Association.

The report of the Committee on Ballast particularly deserves your consideration as after giving it a careful study one cannot avoid coming to the conclusion that if the crushed stone industry is to hold its present position in the ballast field it is absolutely imperative that definite and specific attention be given this subject during the coming year.

It is pleasing to be able to report that marked progress has been made during the past year in increasing the membership of the Association, the report of the Membership Committee indicating that 26 new active companies and 19 new associate companies joined the Association. Also it is encouraging to see that 42 companies made substantial increases in their dues. Without doubt the progress which the Membership Committee is able to report is due in no small part to a greater cooperation from the membership during the past year than has been the case heretofore and it is certainly hoped that this cooperation will be continued as it would seem that such assistance from the entire membership is the only logical means of obtaining new members.

In conclusion your President wishes to express his most grateful appreciation for the helpful support which has been forthcoming throughout the year from the Executive Committee, Board of Directors and the membership at large. Without such unselfish and generous response to the many requests which he has made and which in many instances entailed personal sacrifice, the work of our Association could not have gone forward as it has. Other matters which your president believes should be of direct interest will be presented for your consideration in his verbal report to be presented from the convention floor.

Survey by Universal Portland Reveals Increased Construction

An increased volume of residential and highway construction and increased farm building in 1930 are expected to more than offset moderate declines anticipated in commercial and public building, according to a survey made by the Universal Portland Cement Company, Chicago, among building material dealers located in all sections of the middle west. More than 1100 dealers contributed opinions based on close observation of their own local conditions.

Five dealers out of every six expressing views as to the effects of the recent stock market decline on construction in their localities state that it will exert either a favorable influence or no influence at all.

Total construction in 1930 is expected by dealers to exceed 1929 volume in western New York, eastern Pennsylvania, West Virginia, eastern Ohio, northern Illinois, Wisconsin, Kentucky, southern Minnesota and Iowa.

Total construction in 1930 will about equal 1929 volume in western Pennsylvania, western Ohio, Indiana, southern Illinois, northern Michigan, northern Minnesota and South Dakota.

Some decline in total volume is anticipated in central Illinois, southern Michigan and North Dakota.

On the whole, dealers express conservative optimism about 1930 construction prospects.

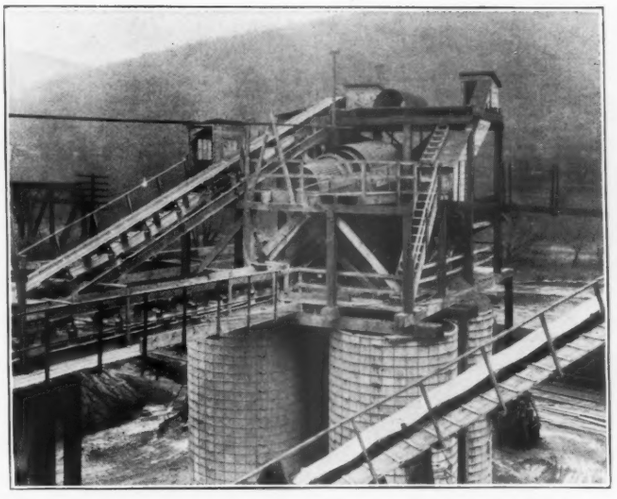
Washed Sand, Gravel, and Crushed Stone Produced in New Plant at Susquehanna

Madison Sand and Gravel Corporation's Operations Described

THE new plant of the Madison Sand and Gravel Corporation at Susquehanna, Pa., is quite unlike the usual type of plant found in northeastern Pennsylvania, because particular attention is given to the production of washed and crushed gravel in a district where generally sand has been sought and gravel avoided. The recent adoption of gravel for pavement by the Pennsylvania Highway Department has made this a valuable feature.

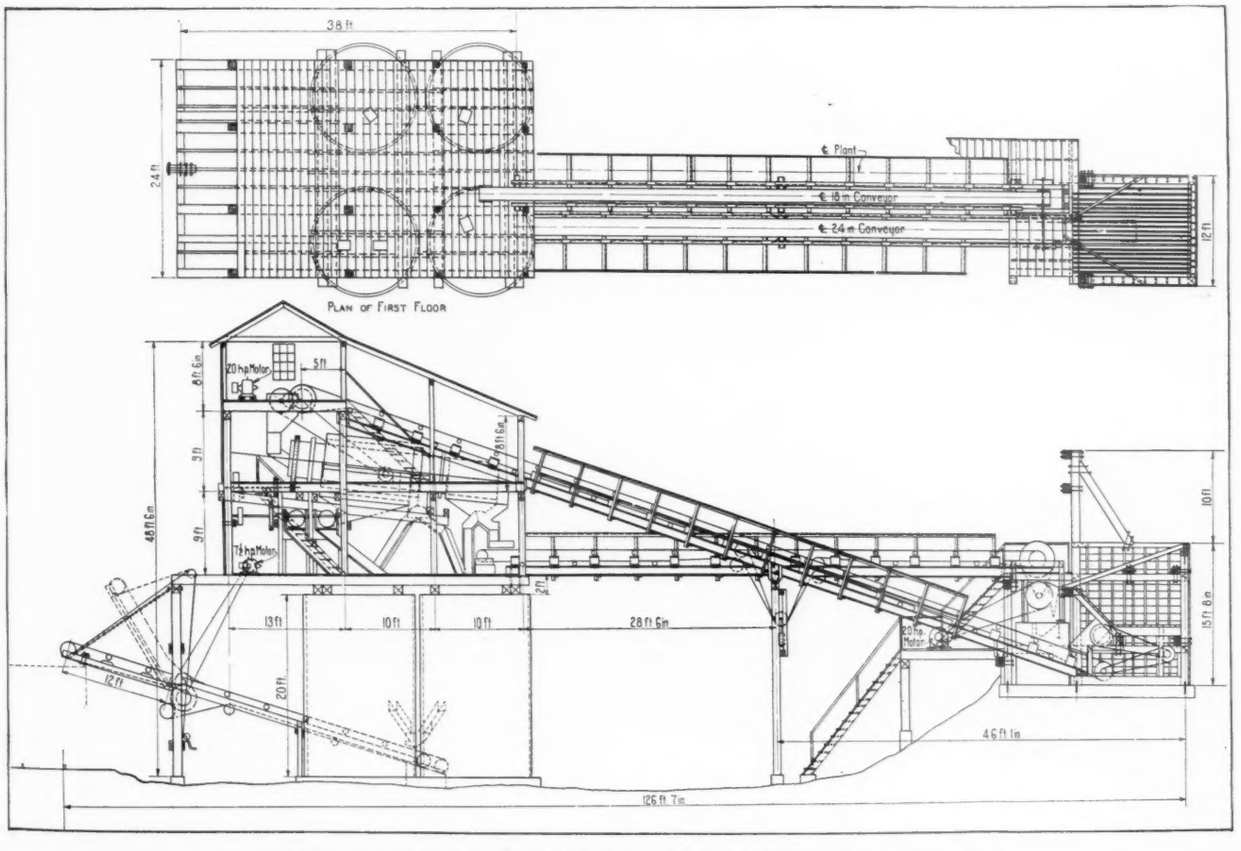
The corporation operated a similar plant at Solsville, N. Y., for four years and introduced totally crushed gravel as a substitute for crushed stone. The plant was sold to the Rock-Cut Stone Company in the fall of 1928.

The corporation was then reorganized by its president and general manager, J. G. Carpenter, who is perhaps better known as the executive secretary of the Empire State Sand and Gravel Producers' Association. The choice of a new location was made after careful study of deposits and market conditions.

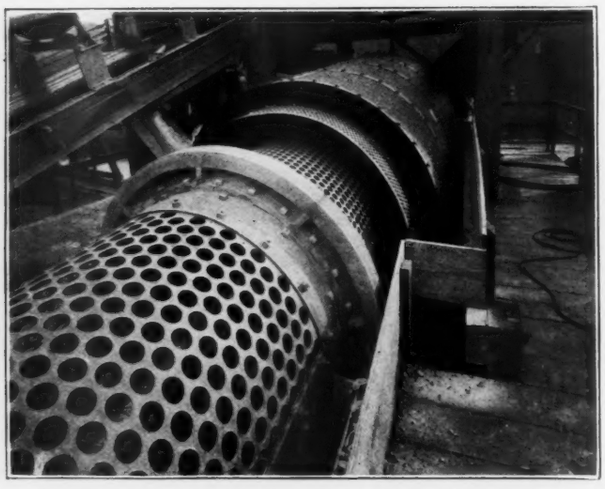


Main screens, chutes, bins, main conveyor, and crushed-stone conveyor

The new deposit is located on the main line of the Erie Railroad between the cities of Binghamton, N. Y., and Scranton, Pa., and is the only plant



Plan and sectional elevation of Madison Sand and Gravel Company's plant



Main conveyor at upper left, and main screen

on the main line for over 100 miles either way. Practically all the material lies above the level of the plant and is massed nearby. The deposit is a glacial formation and one of the largest in Pennsylvania. It comprises about 54 acres and will develop a face probably 150 ft. deep.

Class of Material and Plant Capacity

The material is almost pure silica and is quite loose except where strata of gravel exist. There is no overburden and the material runs about 50-50 sand and gravel. Portions of the deposit contain large quantities of fine sand suitable for abrasive, engine, and asphalt grades.

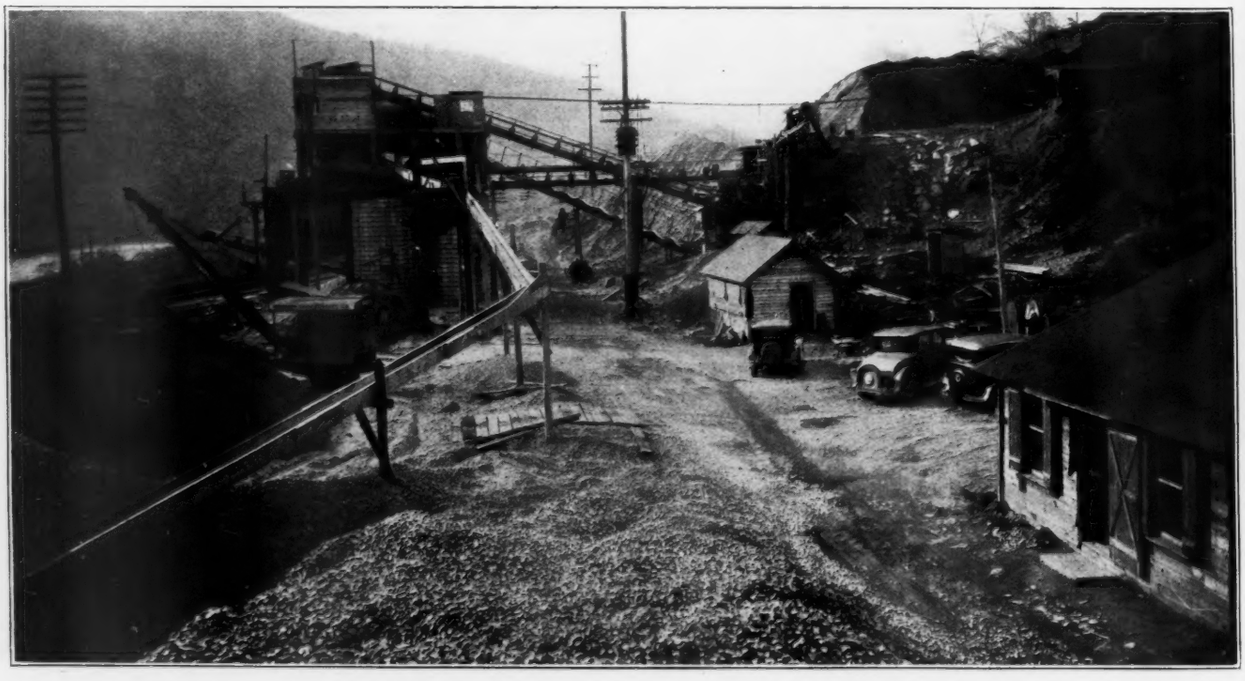
The plant has a capacity of 20 cars per day and was designed by F. M. Welch of the Welch Engineering Service, Greenville, O. It was built in the spring of 1929 under the direction of J. Colby Carpenter and has since been producing washed sand, gravel, and crushed stone for many important jobs. Striking features of the plant are its compactness, simplicity, and impressive stability.

System of Excavating

Excavation is made with a Beaumont cable-drag-scraper outfit of 2-cu. yd. capacity, now using a 1½-cu. yd. improved LeClair bucket, to a 12-ft. by 12-ft. Welch gravity grizzly made up of 1½-in. by 4-in. steel bars set 3 in. apart at the top and 4 in. at the lower end. The rejects run direct to a 15-in. by 24-in. Superior jaw crusher located over the main conveyor belt. The fines pass to a large hopper and are fed to the main conveyor belt by a Telsmith 24-in. reciprocating-plate feeder.

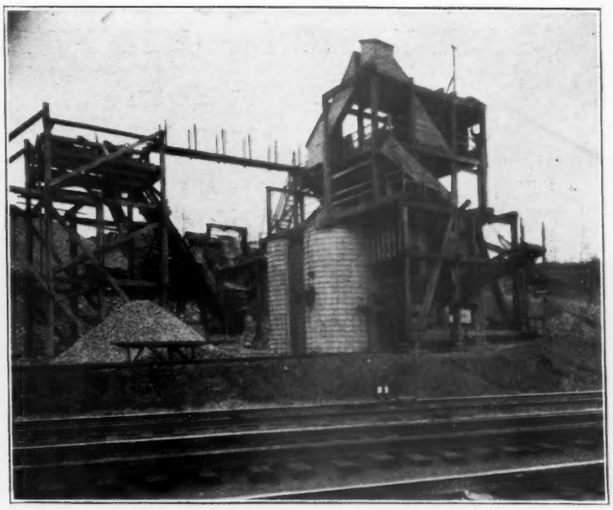
The main conveyor frames are made of 12-in. steel channels and are equipped with 24-in. extra-heavy belting and Stearns-Fairfield idlers. This conveyor discharges into a steel hopper, from which the material is sluiced to a Welch 48-in. by 24-ft. triple-jacketed rotary screen. The screen is extremely heavy and has locomotive-tire trunion rings running on 30-in. wheels. It has a 4-ft. scrubber section and is driven from a standard spur pinion, meshing at the lower point of the ring gear. Five months' steady use has not developed noticeable wear or even a loose nut.

The material passing the screen is collected in two steel hoppers under the screen, each hopper having two compartments. The sand passes to a steel chute 18-in. wide with all the water used in washing. Perforated plates in the bottom of this chute take out mason sand and the discharge is dewatered by a No. 6 Telsmith tank outside the plant, and is run to ground storage. The oversize



Stock-piles siding at left. Hoist-house and pit at upper right. Waste flume leading to lower left corner

Drag-scraper working in bank



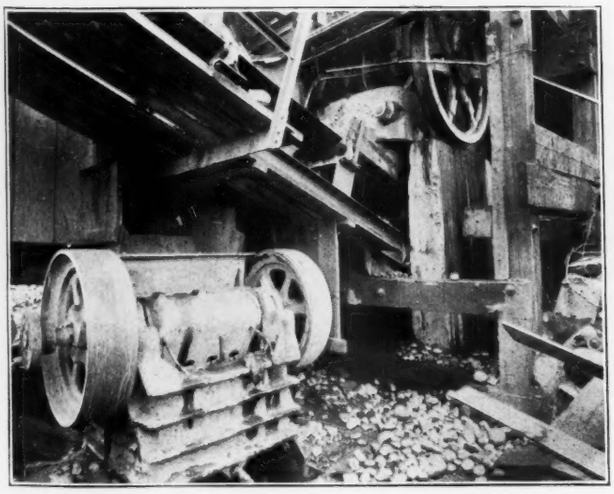
Main bins and screening structure

goes to three 30-in. Lewistown sand washers, where clean water is added. These washers scrub the sand thoroughly and deliver it to the bins relatively dry.

Plant Operation

The gravel is distributed to the bins by a complete system of steel spouting with adjustable gates, making possible the proportioning of any desired mix of gravel in any three coarse aggregate bins.

Oversize from the screen, including No. 3 when desired, are carried by an 18-in. return conveyor on the same construction as the main conveyor, over a stationary tripper to the Superior crusher. Material is taken from the tripper and chuted to a 9-in. by 36-in. Wheeling roller-bearing crusher, from which it is carried by an 18-in. belt conveyor, on 80-ft. centers, to a rotary screen over the crushed-stone bins. This material passes to the truck-loading bins or is run to ground storage. Trucks are loaded beneath the bins. In case heavy gravel production is desired, the secondary crusher unit may be cut out by merely removing a 2-ft. section of the spout leading from the tripper. All trucking is contracted.



Upper crusher feeds main conveyor belt. Lower crusher feeds conveyor to crushed-stone bins

Four Craine concrete-stave silos are set in a square support, the superstructure of which carries the screen and sand washers. A 24-in. belt conveyor for loading cars operates between the silos, at right angles to the siding, and has a hinged section at the outer end so that it can be raised to permit the passage of the engine in placing cars. Cars are loaded from the inside and trucks from the outside of the bins. Telsmith quadrant gates are used.

Pumping System

Water is obtained from the Susquehanna River through 350 ft. of 8-in. pipe by a 6-in. Morris pump at the rate of 1,600 g.p.m. The pump is operated by a 100-hp. motor and is designed to deliver 1,200 g.p.m. to an elevation of 170 ft. at a pressure of 20 lb., for hydraulicking material to points within reach of the dragline.

All plant units are driven by General Electric 440-volt motors. Remote controls are provided for motor operation and high-power flood-lights for night operation.

Car-loading and light excavation is done with a Universal 35 crane shovel equipped with a clamshell bucket.

Office and Officials

The operating office is at the plant. The official office of the Madison Sand and Gravel Corporation is at Hamilton, N. Y., but the business of the Susquehanna plant is largely conducted at the office at the plant. John G. Carpenter, who was president and general manager of the old corporation occupies the same positions with the reorganized corporation; Hugh Bryan, who was a director of the former corporation, is secretary; and Bruce P. Leslie, who is engaged in the real estate and insurance business at Susquehanna, Pa., is treasurer.

Report of the Director of the Bureau of Engineering to the Research Committee*

AT the last annual meeting of the Association the research work of the new laboratory was briefly summarized in a paper before the Association entitled, "Our New Laboratory and Some Test Results." During the past year the work of the laboratory has proceeded along the general lines to which the Research Committee agreed during its several meetings last year and in the present report a brief statement will be made of the purpose of these investigations and the results accomplished.

1. The Effect of Voids in Crushed Stone on the Strength Properties of the Resulting Concrete. Investigations which were reported at the last annual convention showed the effect of various gradations on the percentage of voids. The lowest percentage of voids was obtained with a gradation omitting the intermediate sizes of stone. A low percentage of voids in stone is important when the proportions of concrete are stated by arbitrary volume such as 1:2:4, because the cement factor is affected. It would be, in general, undesirable for producers to make stone with a gradation omitting the intermediate sizes and consequently further tests were conducted in the laboratory to determine just how important it was to use a gradation purposely held to very narrow limits. The results of this investigation were published in the April, 1929, issue of "The Crushed Stone Journal," and they indicate that it is unnecessary to hold the intermediate sizes within close range as far as the effect on strength and percentage of voids is concerned. There can be a rather wide variation in intermediate sizes with only a small effect on the percentage of voids or on the strength. The workability of the concrete, of course, may suffer by wide variations in gradation. The point of the whole investigation is, however, that it will be unnecessary for specification writers to require a gradation which will insure the very lowest percentage of voids. This would be very uneconomical and accomplishes no very valuable result.

2. Tests on Crushed Stone and Gravel Concrete. The preliminary tests on concrete involving crushed stone and gravel aggregates were reported at the last annual convention. These tests provoked quite a lot of discussion in the trade journals, primarily because their purpose was misunderstood. The primary purpose of the investigations was not at all to make comparisons of various aggregates, although such comparisons were necessary to the attainment of the final aim of the investigations. The real purpose of this series of tests was to attempt to develop a means for the design of concrete which would have a given beam strength irrespective of the type of aggregates used.

As a first step in this procedure the concretes were prepared, all made with like arbitrary proportions of 1:2:3½ by loose volume. These results were published in the March, 1929, issue of "The Crushed Stone Journal" and they were encouraging in most cases in showing that crushed stone had considerable merit as a coarse aggregate for developing high beam strength. Under this arbitrary method of proportioning, however, as a rule the stone concrete contained a somwhat higher percentage of cement than concrete made with rounded fragments and consequently as a next step this series of tests was repeated, this time, designing the concrete with an identical quantity of cement in all cases, 6.3 bags per cubic yard; the proportions being varied to accomplish this end and the ratio of fine to coarse aggregate being determined by a method which has been used elsewhere. Again, the results of these tests were encouraging in showing that most of the crushed stone concretes still had a superior strength in cross-bending and this series furnished further information leading to a method for the design of concrete for equal beam strength.

Still a third series of tests has been completed using a method of design which gives very promising results. In brief, the method is as follows:

a. The establishment of the shape of the modulus of rupture-water cement ratio curves for crushed stone and gravel concretes.

b. The determination of the strength of concrete made with different aggregates and having a known water ratio.

c. Drawing water ratio curves through these established results parallel with the already established shape of the water ratio curve.

d. From this series of curves determining the proper ratio to use for each of the aggregates tested.

e. Actually making laboratory tests on concrete whose water ratio has been determined in this way for the purpose of checking accuracy of the method.

To summarize the whole matter it seems quite feasible by this method to determine the proper proportions of concrete to use to obtain any desired modulus of rupture. This is a highly important investigation and the outcome is of very great importance to crushed stone producers sup-

* Read by A. T. Goldbeck, Jan. 21, before annual convention, National Crushed Stone Association, Gibson Hotel, Cincinnati, O.

plying crushed stone as an aggregate in concrete, for crushed stone does have merit as an aggregate in road slabs, and it will be very desirable to have highway concrete designed on the basis of its beam strength.

3. Investigations in the Soundness of Stone. Investigations in soundness have been conducted with several objects in view. In the first place, the sodium sulphate test for soundness is now specified as a definite requirement in many specifications and the value of this method has been seriously questioned. It has been found that when the same sample is sound, in two different laboratories check results are not obtained, some laboratories reporting the sample sound and others unsound. Further, it has been stated that the test is too severe, in that it rejects material which is really suitable for use. Our laboratory first investigated the effect of a number of possible variations in the method of making the test and it was found that the test results obtained depended in some measure on minor variations in test procedure. The results of this investigation will be valuable in helping to standardize the test, in other organizations having this work under way.

Comparisons were also made of the sodium sulphate test with a severe form of freezing and thawing test which has been developed in our laboratory. Briefly, it is thought that some rocks which are badly disintegrated by the sodium sulphate method are unaffected by the freezing test. On the other hand, rocks which are known to be unsound are rapidly disintegrated by both methods. The sodium sulphate method therefore seems to give false indications in the case of some rocks. Also, in connection with soundness tests, a laboratory investigation was conducted in cooperation with the Committee on Filtering Materials, Sanitary Engineering Division of the A. S. C. E., which committee is also endeavoring to standardize the method of making the sodium sulphate test. The results of many of these investigations have been summarized in the July, 1929, issue of our "Journal."

4. Studies of Stone Screenings. In connection with this project it was necessary to prepare material by screening it to a lot of different sizes. A great deal of time has been spent in preliminary work in the preparation of this material. This investigation will be conducted during the present winter.

5. Investigation of Flat and Elongated Pieces. Recently specifications have been written requiring that not more than 5 per cent of flat and elongated pieces shall be used. This has resulted in some rejections of stone from quarries which have been satisfactorily used for a number of years.

A. T. Goldbeck, director of engineering, the National Crushed Stone Association

Unfortunately the specification limit of 5 per cent seems to have been arbitrarily chosen, and it is not based on reliable data. Consequently it seemed desirable to undertake a series of tests to determine the real effect of flat and elongated pieces. This investigation will involve the effect of different percentages of flat and elongated pieces on the difficulty of finishing and on the strength of the resulting concrete. There will also be involved the question of proper proportioning to obtain workability when different percentages of flat and elongated pieces are present. The preliminary work in connection with this investigation has already been performed and it is hoped to complete this test very shortly.

6. Special Investigations. During the past summer the laboratory has been constantly interrupted in its general investigational work by the necessity of carrying on work for individual producers, which needed immediate attention. Generally this work was made necessary because of rejections of large shipments of stone for different reasons such as flat and elongated pieces, too high a percentage of flat pieces, presence of oil coating, presence of stone containing iron oxide stains, etc. All of this work is of value but has somewhat hampered the

progress of our research projects in view of our small laboratory force.

7. Effect of Dust Coated Stone on the Strength of Concrete. Further tests have been made at a one-year period on the effect of dust coatings on stone on the properties of concrete and these tests bear out fully the results which have already been reportd on this subject, namely, that dust coatings up to 5.7 per cent have very little effect on the strength of concrete. And the one-year tests show a substantial gain over the 28-day tests. Those concretes containing dust show fully as high strength as those without dust.

8. Proposed Bituminous Investigations. Thus far the laboratory has not conducted investigations on bituminous materials, and it proposed during the coming year to make use of some of the laboratory equipment fund available for the purchasing of bituminous testing equipment. At the start this investigation will probably involve the question of stability of bituminous mixtures. This alone is a very big problem, for it has many variables, including the shape and characteristics of various kinds of coarse aggregates, their gradation, the question of filler material, as well as characteristics of bituminous materials. It is necessary, however, that we make a start on bituminous investigations, for the bituminous type of road in which crushed stone is involved is highly important and is becoming increasingly so. There is the possibility also of developing new methods for bituminous road construction, making use of crushed stone, and we should be in a position to look thoroughly into this possibility.

American Concrete Institute To Meet in New Orleans

The twenty-sixth annual convention of the American Concrete Institute will be held February 11 to 13, at the Roosevelt Hotel, New Orleans, La. The sessions of the Institute are preceded, February 10, by the convention of the National Concrete Products Association, while the Cast Stone Institute has meetings during the same week. The following reports and addresses have been announced by Harvey Whipple, secretary of the American Concrete Institute, whose headquarters are in Detroit, Mich.

"Construction Specification for Concrete Work on Ordinary Building," by Arthur R. Lord.
"Construction Specification for Fabricating and Setting Reinforcing Steel," by W. F. Zabriskie.
"Concreting Methods at Chute a Caron Dam," by I. E. Burks.
"Specification for Centrally-Mixed Concrete," by Miles N. Clair.
"Design and Operation of Central Mixing Plants," brief reports by members of Committee 602.
"Effects of Variations in the Curing Conditions of Concrete," by H. F. Gonnerman.
"Winter Concreting Methods," R. C. Johnson.
"Preliminary Studies of High-pressure Steam Curing in the Manufacture of Concrete Masonry Units," by P. M. Woodworth.
"Volume Changes in Concrete Masonry Walls," by W. D. M. Allan.
"Recommended Practice for Manufacture of Standard Concrete Masonry Units," by P. M. Woodworth.
"Recommended Practice for Use of Cast Stone," Louis A. Falco.
"Color in Concrete Products," by Raymond Wilson.
"Plant Design for Single or Multiple Shift Operation," by Benjamin Wilk.
"Reinforced Concrete Column Investigation," by W. A. Slater.
"Economics of Tall Building Design," by R. R. Zipprodt.
"Concrete in the New New York Code," by P. A. Phillips.
"Deflections of Reinforced Concrete Members," by T. D. Mylrea.
"Good Practice in Finishing Floors," by John G. Ahlers, discussed by W. E. Hart.
"Design and Construction of the Bonnet Carre Spillway," by Capt. Helmer Swenhold.
"Making and Placing Concrete Revetment Mat," by Lieut. Morris W. Gilland.
"Design of Gulf Shore Protection Structure," by J. B. Converse.
"Cementing Oil Wells," by J. E. Hough.

An excursion on Mississippi River will occupy one afternoon. President E. D. Boyer will deliver an address on Thursday afternoon. The convention will close that evening with a banquet for which a special program is being prepared.

Resume of the Activities of the A. S. T. M. Committee C-7 on Lime for the Year 1929

By the Secretary, W. F. BRUMBAUGH, Technical Director, National Lime Assn.

Committee C-7 on Lime has formally approved a resolution to the effect that the A. S. T. M. and the American Institute of Architects act as joint sponsors in organizing a sectional committee under the procedure of the American Standards Association to draw up plastering specifications covering all materials, which would be national in their field of application. Such a sectional committee would be composed of representatives of all interested groups, such as producers, consumers, producers of materials to which plasters are applied, those responsible for the execution of the work, and groups representing financial institutions, and would function autonomously under the A. S. A. committee procedure. The personnel of the sectional committee is now practically complete, and it is expected that the initial organization meeting will be called within the near future.

Another important feature now before C-7 is the general reorganization of existing sub-committees, with the special view of initiating a study of new material to be presented on finishing lime, together with a study of masonry mortars and definitions relating to the various physical conditions in which lime is marketed.

In What Respects Should the Quality of Crushed Stone Be Improved?*

By A. S. REA,
Chief Engineer, Bureau of Tests, Ohio Department of Highways

IT IS not my purpose to tell the members of the Association what methods or procedures you are to follow to accomplish this but rather to give you something of our experience in this State and call attention to some of our problems and possibly suggest ways and means whereby a better understanding may be had as to our requirements with a view of securing a more satisfactory product.

We fully believe that the producers of crushed stone are just as much interested in securing first class highways and structures as are the engineers and officials interested in the use of stone for aggregate. We believe that a better understanding and a more intense cooperation will go a long ways in accomplishing the result. My attention has been called to a case where a large shipment of crushed stone was made to a project which was not satisfactory due simply to a misunderstanding of the particular purpose to which this stone was to be used.

Perhaps the simplest way to indicate to you producers in what way the quality of crushed stone should be improved, at least so far as the Department which I represent is concerned, would be to pass out copies of our specifications covering various grades and classes of aggregate and suggest that you give us stone to meet those requirements. I fully appreciate the fact, however, that you cannot accomplish the physically impossible and produce grade A quality if you have nothing better than Grade B or Grade C in the quarry.

I am going to discuss this subject, therefore, not from the standpoint of the quality of the stone as stone alone but from the standpoint of the quality of the finished product. In general it may be said that the requirements of specifications covering aggregate for a particular purpose are based on the following fundamental requirements:

A. Quality of the Aggregate
B. Size or Grading
C. Cleanliness or freedom from coating

You can readily see that you may have crushed stone absolutely satisfactory in regard to any one of the above requirements, but entirely unsatisfactory in regard to the other two. We hope that your aim will be so far as possible to give us stone that will be satisfactory with respect to all three.

Quality of the Aggregate

Now in regard to the quality of the stone itself, as I previously indicated, we do not expect you to be able to bodily lift your stone out of one grade into the next higher (although I understand even that has been attempted). However, in practically all quarries there is more or less variation in the quality of the stone particularly with limestones and dolomites found in different strata. Likewise there may be found in some quarries shale and clay or other unsatisfactory material. As you all well know, a great deal has been done, and possibly more can be done, in improving the quality of the product by proper quarry operation. In some cases this may involve the stripping of some of the top layers of stone which may be badly weathered or a much softer stone than found in the other ledges of the quarry. In some quarries the variation may be said to be more horizontal than vertical. In other words on one side of the quarry the stone may be of much better quality than on the other. We have several quarries in this state where this condition is most pronounced. Quite often the softer grade of stone may be entirely satisfactory for certain purposes, such as base construction or even for the first course in traffic bound construction—but if you are called on to furnish stone where a hard aggregate is demanded, such as covering material for a bituminous surface, surface treatment or for the wearing course of a traffic bound road—don't ship soft stone—work the other side of the quarry or let some one else furnish the aggregate. In some cases it will be found practical by quarry operation to supply the grade called for. In some cases of course this may not be found economical or practicable.

It should be your aim at all times to improve the quality wherever possible by eliminating so far as possible all material which you know to be objectionable whether it be top layers of weathered stone or avoiding the working of ledges of very soft or shaley stone.

Size or Grading

This second requirement is perhaps the most important of the three to discuss with you producers for here is where our engineers have their greatest complaint and I know where you men are in a position to help materially. This is really an important matter and I am glad for the opportunity to discuss this matter with the members of this Association. We note a marked difference in the adherence to specified sizes by the material interests fur-

* Read January 21, 1930, before annual convention, National Crushed Stone Association, Cincinnati, O.

nishing aggregate in this State. Some producers almost universally give us the sizes which are ordered, while in other cases our engineers report it is almost a continuous fight to obtain satisfactory grading. What is the reason for this condition? First, it may be a matter of equipment or the proper operation of the equipment. It goes without saying that it is going to be impossible to produce properly graded aggregate with improperly designed or inadequate equipment. The solution in this case is obvious. Second, it may be due, not to the inability to produce the specified sizes, but to the fact that you are trying to fill orders for smaller sizes and feel compelled, for example, to rob your concrete stone of practically all your ½-in. or ¾-in. sizes. We always experience more trouble along this line during the late summer and fall months when extensive surface treatment work is being carried on. Third, the unsatisfactory or non-uniform grading may be due to the manipulation or handling of the stone after it comes from the bins. We all know of course that any aggregate may be graded perfectly as it goes into the bins but by the time it reaches the job may be entirely unsatisfactory so far as grading is concerned. This is particularly true where the grading of the aggregate covers a wide range, for example, concrete stone from ¼-in. to 2-in. in size. With every handling of the stone there is the possibility of segregation. This tendency starts as soon as the stone is dropped into the bins at the plant and continues with each succeeding handling of the stone until it is finally incorporated in the finished pavement. Special efforts have been made during the past few years to overcome this segregation and a considerable improvement has resulted. Most specifications have requirements covering the storing and placing of aggregates on the job. To quote from the Ohio Highway Department Specifications for concrete pavements: "If materials are stock piled, such piles shall be built up in layers not to exceed three feet in height, and each layer shall be completely in place before beginning the next. Coning or building up of stock piles by depositing materials in one place will not be permitted."

If the material is reasonably uniform in grading in the car when it reaches the job, and this procedure is rigidly adhered to, very satisfactory results are obtained. It is up to the aggregate producers to make all possible effort to adopt methods at the plant which will insure uniformity in grading. Some of the methods which have been followed include the use of cones and baffle plates below the discharge chutes and to some extent the moving of the car back and forth during loading. You men on the job no doubt have adopted other schemes to overcome this very objectionable feature and I hope there will be some interesting discussion along this line.

It appears there are still some who cannot appreciate the importance of proper sizing or grading of aggregates. We consider it most important. In some cases it practically means the difference between success and failure. From the standpoint of uniformity it is important whether the aggregate is to be used for macadam, for covering material, or for concrete. In the case of concrete, it is essential that the aggregate be properly graded, not only from the standpoint of uniformity but also from the standpoint of strength and durability of the concrete. Many failures of concrete have been the direct result of segregated aggregates.

At this time the matter is considered of so much importance that some of the states are now specifying separated sizes of coarse aggregates, that is, they specify the proportions of two or more sizes of coarse aggregates—just as has been done for certain bituminous concretes for a great many years. Our department seriously considered incorporating a requirement of this kind in our 1930 specifications but in view of other modifications which were made, decided to postpone consideration for this year. I predict that within a very few years the porportioning of concrete by using at least two sizes of coarse aggregate will be quite general.

Cleanliness or Freedom from Coating

It has been but a very few years since the matter of washing crushed stone for construction work was unheard of. This had always been considered one of the problems of the gravel and sand producer. However, within the past few years many stone producers have found it advantageous to put in washing plants. Personally, I may say, I have been really surprised at the big improvement which has been accomplished in the results obtained with stone from some of the quarries in this State. This improvement has been made not only for concrete stone and stone used in bituminous mixes, but also for surface treatment work—as one of our maintenance engineers told me a few days ago, "compared with the results formerly obtained there is as much difference as there is between day and night." He stated he had a chance to compare the results of stone from the same vicinity—practically identical so far as quality and composition was concerned, but one had been washed and the other was unwashed, and the difference in results were to him amazing.

The question of whether the stone should be washed or not depends entirely upon the quality or character of stone, quarry conditions and the proposed use of the stone. In general, of course, it is the quarries containing at least some soft stone where the greatest improvement is obtained, but even in some cases where the stone is hard, but contains clay seams or rock which results in a

A. S. Rea, State Highway Department, Columbus, O.

sticky or clay-like coating, the washing of the stone has been found worth while.

In order that I might have some specific data to present to you, I have gone over the reports of crushed limestone received in our laboratory during the past year and also have requested a report from our division engineers as to their experience during the past year with particular reference to unsatisfactory stone based on the three fundamental requirements, namely:

A. Quality
B. Size of Grading
C. Cleanliness or Freedom from Coating

Considering the laboratory reports only from the standpoint of compliance with certain specified gradings, I find that of the total number of samples submitted, 33 per cent did not comply strictly with the limits specified. Some of these showed only a slight variation from the specifications and might be considered acceptable. It should be said, too, that we have our engineers in the field make screen tests on the job and that in many cases where grading was not found satisfactory on the job, samples were sent to the laboratory for check tests before rejection was made. For this reason the per cent indicated above is not strictly representative of the unsatisfactorily graded aggregate received on the work.

In some sections of Ohio practically no crushed stone is used for aggregate—gravel or slag being used. In a few instances I had not received a reply from the division engineer's office, but from the reports received it may be said that from the standpoint of quality the stone received which was not considered satisfactory was 10 per cent—where the size or grading was not entirely satisfactory—20 per cent, and unclean or coated stone found objectionable—5 per cent.

In conclusion I would especially urge you to continue your efforts to improve the quality of your product particularly in regard to the size or grading, and wish to assure you that we stand ready at all times to cooperate with you to accomplish this and which I am sure will be to our mutual benefit.

National Materials Handling Meeting

The Third National Materials Handling Meeting of the A. S. M. E. will be held at the Stevens Hotel, Chicago, March 5-6-7. Six sessions have already been arranged and a group of inspection trips to nearby plants is in course of preparation. The meetings will cover widely diversified subjects in Materials Handling and the shipment of merchandise equipment. Included will be:

"Pneumatic Handling of Coal"
"Use of Portable Conveyors"
"Use of L.C.L. in Package Shipment"
"Economics of the Tractor and Trailer in Industrial Handling"
"Materials Handling as an Important Factor in Plant Maintenance"
"Laying Out Proper Materials Handling Systems"
"Successful Materials Handling Systems and Requirements of Manufacturers Pertaining Thereto."

Also two symposiums, one on "Shipment of Goods on Skid Platforms," and the other on "Safety in Materials Handling."

Speakers for subjects already assigned include Mathew W. Potts, New York; Willard Brinton; R. L. Lockwood, U. S. Department of Commerce; E. J. Barney, Frigidaire Corp.; N. H. Preble; W. C. Stuebing; C. E. Johnson, Eastman Kodak Co.; and others of like caliber and prominence.

The National Industrial Exposition will feature to a large extent materials handling equipment, supplies and accessories. The exhibitors in this group will include such prominent companies as the International Harvester Co., Northwest Engineering Company, Automatic Transportation Co., Louden Machinery Co., Lewis-Shepard Co., Clark Tructractor Company, Jervis B. Webb Co., The Whiting Corp., and many others of similar importance in the industry. Actual demonstration of materials handling will be in operation so that the visitor will be able to secure first hand, perfect knowledge of the requirements of equipment as well as the actual installation and operation of same.

Report of Committee on Mechanical Elimination of Dust*

By FRED O. EARNSHAW, Chairman

IN THE early part of his administration, President Wise appointed a committee to report on the "Mechanical Elimination of Dust from Crushed Stone."

What constitutes "dust" in or upon crushed stone? This appears to be a question of somewhat varied opinion and has been with us many years. Until recently it has received little or no attention on the part of most crushed stone producers. Many of our competitors producing gravel use hydraulic dredges, sucking the aggregate from rivers, lakes and water-filled pits. The very nature of this operation makes it not only possible but compulsory to produce aggregate free from dust. Our slag competitors produce material whose physical condition is such that they do not have to contend with a fine pasty dust, which clings to the average crushed stone produced in damp weather.

In an article written some time ago, Mr. Goldbeck, Director of our Bureau of Engineering, made reference to the A. S. T. M. method for determining the percentage of dust, and stated that dust particles determined in this way are very small and approximately all pass an 80 mesh sieve.

Mr. Mattimore of the Bureau of Tests of the Pennsylvania State Highway Department in his 1929 specifications for gradation of crushed stone states that one-half of one per cent of dust passing a 20 mesh sieve is the maximum allowable. He considers plus 20 mesh material as fine aggregate.

In connection with bituminous construction, dust coating is distinctly harmful. In one case it was brought out by the Engineer of Tests of Virginia, that dust coated stone used with cut-back asphalt for the manufacture of cold patch material, resulted in the complete disappearance of the bituminous material from the stone after a heavy rain. His contention is that the dust prevented proper adhesion of the bituminous material which was readily washed away.

It is also well known that for bituminous macadam, dust coated stone is harmful. The bituminous material is merely poured on the stone and there is no opportunity for it to do other than to cover the dust coating. Proper adhesion between the aggregate then is virtually impossible.

There is still some doubt in the minds of many engineers as to the effect of a high percentage of dust in the coarse aggregate when used in Portland cement concrete, due primarily to a feeling that this dust will form a weak surface layer which will later scale off owing to the action of traffic and the weather.

In certain states, the percentage of dust in the coarse aggregate has been limited to 1 or 1¼ per cent by weight. Cleanliness of stone has been discussed with a number of producers and also with a number of engineers and there is no question in our minds, that engineers are decidedly in favor of having clean stone, free from dust coatings.

What happens to the dust in crushed stone, during the ordinary procedure of dry screening and sizing? There is a cloud of dust arising in the screen room, caused by the action of the screens and movements of the stone thereon. There is also a very small percentage of coarser dust or fine screenings which seeps down into the bins, the fine dust eventually settling and coating the stone that is in the bin. This may not be the condition in all plants but nevertheless, in preparing crushed limestone, this condition, generally speaking prevails.

This dust that settles on the stone in the bins, is increased and later concentrated by the action of drawing the stone out of the bins into cars, where additional concentrating and settling occurs to some extent.

This settling and concentrating of dust, can, and has been partially eliminated by the use of ventilating stacks and fans, which suck a great portion of the dust into the fan, where it can be spouted to convenient storage. This process of dust elimination requires considerable installation and is not 100 per cent effective. One of our large operators reports that as long as they continued to dry screen their stone, using various devices and expending thousands of dollars for systems of dry screning, *the dust still prevailed.*

When cars are loaded at the crusher on a still, dry day, there is a certain amount of chafing and chipping taking place, while the stone is being drawn from bin gate to car. Several cars are loaded: they look good as they stand and the material unquestionably would pass the engineer's requirements if it were used at once. Unfortunately for a great many producers, this stone is shipped great distances, sometimes being a week in transit. During the summer and early fall months, it is often subjected to one or more severe rain storms, with the result that the small amount of dust that was unnoticed on the stone at the time of loading has now been concentrated and lies just below the surface, the depth varying with the severity of the

* Read Jan. 21, 1930, before annual meeting, National Crushed Stone Association, Hotel Gibson, Cincinnati, O.

rain. Thus, the dust, at first unnoticed has been accumulated as a bad coating on a layer of stone a few inches thick and it presents an unpleasant and unsatisfactory appearance. Stone arriving at destination in this condition unquestionably is rejected.

Conditions similar to this just described, have been experienced by members of this Committee and the consensus of opinion is, that wherever and whenever possible, consistent with reasonable cost, aggregates for concrete and highway construction should be washed.

There are several methods of procedure in the washing of crushed stone. In some cases due to the physical condition of the quarry or pit, it is necessary to install an extensive scrubbing, immersing and rinsing plant to obtain a uniformly clean aggregate.

For the average open-pit quarry (and most limestone mines) the practice of dry screening and sizing of stone first, then subjecting it to a thorough rinsing is adequate.

This latter is accomplished in several ways, one of which is by the use of a revolving screen, preferably an open end screen with a substantial fine mesh wire jacket and a 4 in. pipe suspended in the center the full length of screen. This pipe is perforated with holes of approximately 1/8 inch in diameter, closely spaced and in such position that the spray will, for the most part strike the stone at the highest point as it follows the circle of the screen.

Another very efficient method, but one perhaps not having as large a capacity as a revolving screen, is the use of a vibrating or shaker screen. The degree of pitch can best be determined for each individual installation. This screen is sprayed from a series of pipes with perforated holes, the position of the holes being such as to direct the streams of water against the flow of stone over the screen.

As one of our largest producers states, the tendency among engineers is toward specifying washed material and there are so many things in favor of washing against nothing to its disfavor, that we do not believe any other method of preparing stone should be followed, unless water for washing is entirely lacking.

Washing stone has had the effect in some cases, of changing specifications, allowing more of the 3/16 to 3/8 in. size to be incorporated with the coarser aggregates. The consequence has been a reduction in voids, which results in a lower cement factor and cheaper concrete. This helps in our competition with rounded coarse aggregates and is of great benefit to the average producer by lessening the amount of screenings he produces.

The cost of this method of eliminating dust and coated aggregate has been reported by several of the larger producers as being practically nil.

It is a fact, that in some plants the washing of crushed stone, instead of increasing the cost, has actually decreased it, for regardless of weather or pit conditions, the producer who is equipped to properly wash or rinse his stone, can operate day in and day out, and produce a uniform, clean aggregate, avoiding the piling up of orders due to a shut down of the plant because of weather conditions.

With the present trend of thought among engineers and producers, it appears that the time has arrived when all producers should be seriously considering the best and most efficient methods adaptable to his operating conditions for the elimination of dust.

Road Show and Convention of Interest

(Continued from page 35)

Devices for Concrete Aggregate." The meticulous nature of this report may be guessed from the fact that it covers six typewritten pages. It, of course, deals with a phase of material handling which takes place after the material passes from the control of the producer, and it is therefore theoretically outside his purview, but the alert producer likes to watch his goods to their incorporation in a finished pavement, and even after that he will observe the resistance which they are opposing to the constant hammering of traffic.

It is not necessary to go into the details of this report, but merely to indicate the careful manner in which various points are covered. For instance, taking a few paragraphs almost at random:

"There shall be a clearance of at least twelve inches between the bottom of the bin gate and the top of the hopper, so that the overload can be scooped out.

"The hopper and its appurtenances shall be designed and constructed so as to eliminate the retention of varying tare materials on any of its parts.

"The hopper and its appurtenances shall be so designed, constructed and operated, that it will be fully discharged, quickly, without shaking and jarring the scales.

"When more than one aggregate is to be weighed in one hopper, each aggregate shall be in a separate compartment, arranged so that each aggregate can be discharged separately and an overload in either removed. Separate compartments for aggregates are not required for mixers of less than one-half cubic yard capacity.

"A separate hopper shall always be used for weighing cement."

And on and on it goes into every little detail of weighing devices.

Volumes can and will be written on this the greatest Road Builders' Convention. The research work of 1929 and its discussion will reflect in great progress during 1930 and the work of assembling and correlating facts will be of inestimable value in future investigations of the application of cement and aggregate to the road-building programs of the nations of the world.

Report of the Research Committee*

By JOHN W. STULL, Chairman

DURING the past year your Committee on Research held a meeting at Washington on July 16, 1929, at the Association's headquarters and the following members of the committee were present:

John W. Stull, Chairman,
L. C. Bonnell,
C. A. Munson,
A. T. Goldbeck,
J. R. Boyd (Acting as Secretary of the meeting).

At this meeting Mr. Goldbeck presented a detailed report of the research work covering the first six months of 1929.

The committee expressed itself strongly that the research work is the most important activity of the Association and that its success rests largely on the continuance of the research investigations undiminished to the slightest extent. The committee passed the following resolutions which were brought to the attention of the Board of Directors at Atlantic City at their meeting on July 26 and 27, 1929:

WHEREAS, The research investigations of the National Crushed Stone Association constitute the most important phase of the Association's activities and

WHEREAS, The continued success of the Association depends to a very large extent upon the active and vigorous continuance of the work of the Research Testing Laboratory, therefore be it

RESOLVED, That the Research Committee of the Association, in meeting assembled on July 16, 1929, most urgently recommends to the Board of Directors of the Association that adequate and immediate revenue be provided for the continuance of the research investigations during the second six months of the current year, and be it further

RESOLVED, That a copy of this resolution be presented to the Board of Directors at the Atlantic City meeting on July 26 and 27, 1929.

An additional meeting of the committee is scheduled just previous to the annual convention.

The work which has been done in the laboratory of our Association during the past year involves the following projects:

1. The effect of gradation on the strength of concrete.
2. Studies to determine a method for the design of concrete for a given beam strength.
3. Studies on the soundness of aggregates.
4. Investigations of flat and elongated pieces, soft fragments and other deleterious material.
5. Preliminary investigations on stone sand.
6. Routine investigations in connection with the development of new quarries, study of oil-coated stone, stone supposedly unsound and stone containing rust-stained fragments.

Your committee feels that investigations which have been thus far conducted are of great importance to the industry and the results obtained give every indication of being of great value. It is proposed that during the coming year the laboratory will devote considerable attention to bituminous materials investigations which your committee on research feels to be very desirable. Funds are now available for the necessary equipment but if extensive work is to be done an additional assistant will be necessary. The beginning of bituminous investigations on a proper scale is contingent upon the financial status of the Association. The estimated budget required for the laboratory during 1930, including the work on bituminous materials is 13,400 and your Research Committee recommends to the Association that every effort be made to supply the necessary funds for this work. A detailed report of the Director of the Bureau of Engineering to the Research Committee was appended.

John W. Stull, chairman of research committee, National Crushed Stone Association, Buchanan, Va.

* Read Jan. 21, 1930, before annual convention of National Crushed Stone Association, Hotel Gibson, Cincinnati, O.

Simplification in the Crushed Stone Industry*

By R. L. LOCKWOOD
Division of Simplified Practice, U. S. Department of Commerce

THE report of your sub-committee on Standardization of Commercial Sizes of Crushed Stone mentions the fact that you expect to ask for the services of the Division of Simplified Practice, when you have made sufficient progress to warrant organizing a simplified practice project. I have read carefully the report of your sub-committee, and judge that you have already made very material progress along the line of formulating a simplified list of sizes. I notice that the report lists some 83 different sizes, including all of the different screen types, whereas your recommended list of standards includes only 9 sizes, thus representing a reduction of about 90 per cent. This is certainly a move in the right direction and as soon as your present recommendation, or any similar recommendation, has been approved by firms producing at least 80 per cent of the volume of product, our division will be very glad to undertake the work of "selling" your proposal to the other interested groups in your industry.

Before going into the detail of method and procedure on such projects, it may be well to define simplified practice, in order to show its scope and limitations. The word "standardization" is rather loosely used to cover a very wide range of activities. These activities, however, may, for the sake of definition, be divided into two general groups. The first is Technical Standardization, which is creative, and involves the determination of size, material, design or performance for a given commodity. The second is Commercial Standardization or Simplified Practice, which is selective. It involves a careful survey of existing standards of dimension, variety, or other features of a product already in production, a selection of those standards which are of greatest importance from a commercial or economical standpoint. Usually, although not always, this importance is measured by quantity of demand.

Simplified practice, or simplification, as it is sometimes called, is really a new term for an idea which is as old as industry itself. Briefly, it consists in concentrating production on those sizes and varieties of commodities which are in greatest demand. Every manufacturer knows that, other things being equal, it costs less to make things alike than to make them different. Unfortunately, manufacturing cost is not the only factor in industry. A certain amount of variety is essential in order that the commodities may be sold. Furthermore, most commodities must be made in a variety of sizes to meet the real needs of the users. Maximum results from simplified practice can be obtained only through the cooperation of all elements in an industry. The fact that one firm may have reduced the variety of its products to a minimum means very little if competing firms make a totally different list of varieties or sizes. Even when all of the manufacturers of a given commodity have agreed upon a simplified list, containing a minimum number of sizes or varieties, it is necessary to have the cooperation of distributors and users, if the simplified list is to become really effective.

Possibly the best way to show the methods and procedure by which the Division of Simplified Practice handles projects of this character is to cite the history of a specific project. One project, which has become a classic, covered vitrified paving brick, and its history is typical of all. The manufacturers of this product were having hard going and most of them were in the "red." They came to the Secretary of Commerce to ask whether something should be done to improve this condition. They were requested to furnish figures showing the quantity of brick sold in each size made by every firm during a period of two years. A combined tabulation was made, listing quantities of every size sold, and showing the percentage of each in the total sales. The sizes were listed in the order of importance, measured by percentage of demand, and the percentages added cumulatively. The list showed 66 sizes regularly made and sold in the United States. The first eleven sizes covered more than 80 per cent of total demand. The answer was obvious, and the manufacturers voted unanimously to list those eleven sizes as standard or "stock" sizes. The Division of Simplified Practice then called a general conference in Washington and invited representatives of manufacturers, building material dealers, state and municipal highway engineers and all others interested in paving brick. The simplified list approved by the manufacturers was duly presented, and after several hours of discussion, was adopted by unanimous vote. The Division then prepared a detailed report of the conference, and sent it to all interested parties, whether or not they had attended the conference. Attached to the report was an acceptance blank, and a letter requesting that the blank be signed and returned for record. This acceptance is not a contract or definite commitment of any sort, but merely a written indication that the

* Read before the Thirteenth Annual Convention, National Crushed Stone Association, Jan. 20, 1930.

signer approves and endorses the simplified list of sizes and agrees to consider them as his standard of practice, so far as his business conditions will permit.

At any general conference, a standing committee is appointed to sponsor the project. It includes representatives of manufacturers, distributors and users. At the general conference a definite date is set at which the program shall go into effect, and the recommendation remains in effect for one year from that date. Toward the end of the year, the Division makes a resurvey to determine the degree of adherence to the recommendation. In order to be effective at all, the recommendation must have been accepted by producers representing at least 80 per cent by volume of business and by a satisfactory percentage of distributors and users. If, at the end of the first year, the adherence has fallen below this figure, there is obviously something wrong with the recommendation. The standing committee then considers it from all angles and, when necessary, revises the recommendation to meet changed conditions or new development. If no revision is necessary, and it is found that adherence has been maintained or increased, the recommendation is reaffirmed for another year. As a matter of history rather than theory, practically every recommendation has either been reaffirmed from year to year, or has been revised downward. In the case of paving bricks, the first revision conference reduced the number of stock sizes from eleven to seven. At each of three following revisions one size was eliminated until the number was reduced to four, which then covered well over 80 per cent of normal demand.

This kind of procedure assures three important factors: (a) a true consensus of opinion among all groups in the industry; (b) regularity of action; (c) flexibility of recommendation itself. A standard is of no use unless it is used and it will not continue to be unless it is sufficiently flexible to be modified as needed to meet changed conditions in the industry.

In the case of your particular commodity, there seems to be no reason why you cannot put through a simplified practice project, which will enormously reduce the number of this commercial size of crushed stone, which you have to make. The procedure itself is relatively simple. As soon as you have agreed upon a simplified list, by vote of producers representing at least 80 per cent of volume, we will be glad to call a general conference and present your proposal to all other interests concerned, and use our best efforts to convince them that it is a practice and will be a means of serving many. We frequently find that individual manufacturers are reluctant to go along with a proposition of this sort, fearing that they may be called upon to furnish sizes that are included in the simplified list, and that if they refuse such an order, someone else will come along and take it. We find that our own work, directed toward selling the idea to the consumer, frequently prevents any such contingency, particularly when we can show him that it is directed to his advantage to support a sound program of this character.

A number of other projects have been suggested to us in connection with various concrete aggregates, including sand, gravel, and slag. It is probable that one or more of these will come to a head in the near future. We shall be very glad to work with you at any time but must, of course, be assured that any recommendation formulated by your organization represents a real consensus of opinion on the part of the producer as a whole. In other words, you must present a united front. We are very willing to undertake to sell one definite proposal to the entire industry, but we cannot very will undertake to sell five or six different ones. The Division of Simplified Practice, like other branches of the Department of Commerce, is simply a service station. We do not initiate projects nor have we any police or regulatory powers. We act simply as a clearing house or a coördinating agency to coöperate in industry in waste elimination. Our services are available to you at any time, and we hope that you will call on us some time when you are ready.

Clay Used as Filler for Many Common Materials

The extremely finely divided nature of clays and their low cost make them of value as adulterants and as mineral fillers for rubber, linoleum, oilcloth, etc., says Paul M. Tyler, in Information Circular 6155, recently published by the United States Bureau of Mines, Department of Commerce. Kaolin and certain other white clays are extensively employed in the manufacture of high-grade paper, window shades, and so on. Ochre, an iron-stained clay, is used mainly in linoleum; the best grades are also used in paint and wall coatings. The cheaper clays find similar uses in articles, such as heavy wrapping paper and cardboard, where the color is of minor importance. Clay competes with whiting in the manufacture of mechanical rubber goods, rubber tubing, friction and rubber tape, putty, and window shades. It is used in some paints, fertilizers, metal polishes, and abrasive soaps, for "rock-dusting" coal mines as a safeguard against explosions, and for the manufacture of portland cement. It appears to be adapted for use in road asphalt mixtures, plastic roofing, flooring, and, in short, for any purpose requiring an inert, extremely fine-grained material.

Crushed Stone Convention

(*Continued from page* 31)

Owing to the absence of C. M. Doolittle, who was to have presided at the afternoon session on Wednesday, A. S. Lane, of John S. Lane & Son, Inc., Springfield, Mass., took charge of the meeting, which was opened by Otho M. Graves, chairman of the Trade Practice Committee, who reported on the work of himself and his associates. In reviewing the work that had been done, Mr. Graves laid stress on the signal importance of the opportunity offered the industry to go on record as opposing unethical and illegal business practices. In his opinion the adoption of the trade practice resolutions which his committee had framed and submitted for consideration would result in less government interference in business rather than more.

Hon. George McCastle, assistant director of the Trade Conference Division of the Federal Trade Commission, who was present on the speaker's platform, said that it was the aim of the commission to help business solve its problems and that this spirit of helpfulness characterized all the work of his division.

In speaking for the adoption of the resolutions presented by the association's Trade Practice Committee, Mr. Fowler of the U. S. Chamber of Commerce, reminded his hearers of the necessity for providing the necessary personnel to represent the industry and to give effect to the resolutions adopted.

Mr. Graves then moved the acceptance of the committee's report and this was done by a unanimous vote. He later moved for the discharge of his committee, feeling that its work had been done and that it could serve no useful purpose by continuing existence. The convention felt otherwise and, before the matter was voted upon, Mr. Graves withdrew the motion.

Considerable discussion of the proposed resolutions ensued, it being objected by John Rice, of the General Crushed Stone Co., Easton, Pa., that they would place too great a moral obligation upon the consciences of those who might sign them. J. F. Schroeder, of the Linwood Cement Co., Davenport, Iowa, was reluctant to sign them unless his competitors, none of whom was present, would also sign.

Mr. McCastle pointed out that every member of an industry which has adopted trade practice resolutions is equally bound by them, whether he has signed them or not; and Mr. Graves drew attention to the fact that the mere signing of the resolutions could not make illegal what was previously legal or make legal what was previously illegal. To which Mr. McCastle added by saying that any members of the industry taking exception to any resolution adopted could, in signing the resolutions, append a note explaining what their objections might be.

Another point that caused some misunderstanding was clarified by Mr. McCastle, when he explained that resolutions belonging in Group I needed no signature as they were already covered by existing legislation (the Clayton Act), and that resolutions falling in Group II were merely the expressions of the industry. It seemed rather difficult for some of those in attendance to realize that their legal status would not be changed by their adoption of the proposed resolutions. Not until Harold Williams, attorney of Boston, Mass., had explained still further the effect of the resolutions and their potential advantages to the industry as a statement of ethical ideals, and Mr. Graves had spoken somewhat extensively on the nature and extent of the moral obligation involved, did the convention seem satisfied of the usefulness of the proposed action.

Fred H. Edwards, of the Connecticut Quarries Co., New Haven, Conn., pleaded for a greater show of man's faith in man, and E. J. McMahon, of the St. Louis Quarrymen's Association, St. Louis, Mo., reported that the membership of his local association had voted for their adoption. J. E. Weber, of the Casper Stolle Quarry & Construction Co., E. St. Louis, Ill., voiced his belief in the program presented, and he was quickly followed by L. R. Cartwright, of the Mid-West Rock Products Corp., Indianapolis, Ind.; W. M. Andrews, of the Lake Erie Limestone Co., Youngstown, O.; H. H. Brandon, of the C. C. Beam Co., Piqua, O.; J. H. Odenbach, of the Dolomite Co., Rochester, N. Y.; W. F. Wise, of the Southwest Stone Co., Dallas, Tex.; and H. E. Rodes, of the Franklin Limestone Co., Nashville, Tenn.

Mr. Graves then suggested that the Federal Trade Commission's representatives at the Trade Practice Conference to be held the next day would require a more definite expression of the association's will and, to that end, moved that the association express its intention clearly by adopting his proposed resolution favoring the trade practice code as presented. His motion was carried by a unani-presented. His motion was carried by a unanimous vote.

The discussion had consumed so much time that H. E. Rodes waived the reading of his report on the work of the Accident Prevention Committee; and J. J. Forbes, of the U. S. Bureau presented the association's safety trophy to the Marquette Cement Manufacturing Co. for its splendid accomplishment in accident prevention work in 1928. During that year its Cape Girardeau, Mo., limestone quarry, employing, on the average, 77 men, operated 360 days, or a total of 212,921 man-hours, without a single lost-time accident. Honorable mention was made of the Birdsboro quarry of

the John T. Dyer Co., the Speed, Ky., quarry of the Louisville Cement Co., and the Spencer, Inc., quarry of the Mid-West Rock Products Corp., for their operation without lost-time accidents.

In view of the lateness of the hour, L. R. Cartwright, of the Mid-West Company, forewent the reading of his address, and gave way to J. V. Scott, of the National Safety Council, Chicago. At the close of the latter's short review of the council's safety work, the meeting adjourned.

The annual banquet of the association was held Wednesday evening, in the Roof Garden of the Hotel Gibson.

Toastmaster Russell Rarey, of the Marble Cliff Quarries Company, Columbus, O., presided notwithstanding a severe cold from which he was suffering. After the repast had been served, he introduced the Hon. George McCorkle, assistant director of Trade Practice Conferences, who expressed his appreciation and briefly discussed the purpose of his errand to the convention.

W. B. Burruss, internationally known business counsellor, the first speaker of the evening, then gave a humorous oration on "Shakespeare—The Master Salesman."

Capt. Irving O'Hay, philosopher and humorist, then gave a colorful talk on "Cooperation," illustrated with incidents from his own varied experiences.

George E. MacIlwain, business economist, lecturer, author and analyst, spoke on "The Future of Business." His talk was a keen analysis of the present business situation and its causes. He also stated that all indications were for a return to normalcy within the next two months.

Scale of Membership Dues Adopted

At the forenoon session of January 22, the National Crushed Stone Association adopted the following as its basic scale for the determination of the dues that will be assessed against member companies for the adequate support of the association's activities, headquarters, and especially of the valuable research that is under the able guidance of A. T. Goldbeck.

Tonnage sold in 1,000-ton increment	Annual dues
From 0 to 50	$ 50.00
From 50 to 100	100.00
Between 100 and 150	250.00
Between 150 and 200	350.00
Between 200 and 250	450.00
Between 250 and 300	550.00
Between 300 and 350	650.00
Between 350 and 400	750.00
Between 400 and 450	840.00
Between 450 and 500	910.00
Between 500 and 550	990.00
Between 550 and 600	1,060.00
Between 600 and 650	1,140.00
Between 650 and 700	1,210.00
Between 700 and 750	1,290.00
Between 750 and 800	1,360.00
Between 800 and 850	1,425.00
Between 850 and 900	1,475.00
Between 900 and 950	1,525.00
Between 950 and 1000	1,575.00

Over 1,000 tons, figured from following scale:

Tons	Rate
100,000 to 400,000	2 mills
400,000 to 800,000	1½ mills
800,000 to 1,600,000	1 mill
Over 1,600,000	¼ mill

Example: Assume annual tonnage sold, 1,800,000 tons:

Annual dues—	
First 400,000 tons at 2 mills	$ 800
Next 400,000 tons at 1½ mills	600
Next 800,000 tons at 1 mill	800
Next 200,000 tons at ¼ mill	30
Total Annual Dues 1,800,000 tons	$2,250

Note: Flux stone not to be included as tonnage sold.

Officers for 1930

At its Tuesday afternoon (January 21, 1930) session, the annual convention of the National Crushed Stone Association elected the following officers to serve one year:

President, W. F. Wise, Dallas, Tex.

Secretary, J. R. Boyd, Washington, D. C.

Treasurer, F. J. Gucker, Harrisburg, Pa.

Regional vice-presidents: *Canadian*, C. M. Doolittle; *Southwestern*, Harry Landa; *Eastern*, A. S. Lane; *Central*, Allen Patterson; *Northern*, W. R. Sanborn; *Southern*, T. I. Weston.

The above officers, together with the following members, are the board of directors:

W. M. Andrews, Youngstown, Ohio; H. E. Bair, Toledo, Ohio; A. J. Blair, Milwaukee, Mis.; W. W. Boxley, Roanoke, Va.; C. D. Brewer, Duluth, Minn.; L. R. Cartwright, Indianapolis, Ind.; O. P. Chamberlain, Chicago, Ill.; J. E. Cushing, Schenectady, N. Y.; C. M. Doolittle, Hamilton, Ont., Can.; F. O. Earnshaw, Youngstown, Ohio; E. Eikel, New Braunfels, Texas; E. E. Evans, Toledo, Ohio; Otho M. Graves, Easton, Pa.; F. T. Gucker, Norristown, Pa.; J. L. Heimlich, LeRoy, New York; W. E. Hilliard, New Haven, Conn.; W. P. Hodgkins, Chicago, Ill.; E. J. Krause, St. Louis, Mo.; Harry Landa, San Antonio, Texas; A. S. Lane, Meriden, Conn.; Thomas McCroskey, Knoxville, Tenn.; R. N. McDowell, Kansas City, Mo.; E. J. McMahon, St. Louis, Mo.; Allen Patterson, Findlay, Ohio; A. C. O'Laughlin, Chicago, Ill.; E. U. Ragland, Raleigh, N. C.; Russell Rarey, Columbus, Ohio; John Rice, Easton, Pa.; H. E. Rodes, Nashville, Tenn.; W. R. Sanborn, Kankakee, Ill.; James Savage, Buffalo, N. Y.; J. W. Schmidt, Jr., Morristown, N. J.; J. F. Schroeder, Davenport, Iowa; W. L. Sporborg, Syracuse, N. Y.; John W. Stull, Rocky Point, Va.; R. B. Tyler, Louisville, Ky.; Mortimer Wandell, New York City; T. I. Weston, Columbia, S. C.; G. J. Whelan, Cleveland, Ohio; A. L. Worthen, New Haven, Conn.

Ladies' Program

For the entertainment of the women guests of the convention, a very interesting program had been arranged by Mrs. A. Acton Hall, of the Ohio Marble Co., Piqua, Ohio. Following registration in the morning of the first day, the women attended a reception and tea party in their headquarters in the Della Robbia room of the Gibson Hotel, Monday afternoon.

Tuesday was devoted to sightseeing, a trip through Cincinnati's beautiful residential districts and suburbs, a visit to the famous Rookwood Pottery, and a luncheon at the Alms Hotel. After the luncheon each woman was pleasantly surprised by the gift of a Rookwood vase presented by the

association. As each vase was of different shape and color, there were many expressions of astonishment at and appreciation of the thoughtfulness of those who made the selections.

On Wednesday morning the women made a tour of the best shops in the city and, following luncheon at the Sinton Hotel, played cards in the afternoon. That evening they shared the pleasures of the banquet with their hosts and escorts. A farewell luncheon on Thursday completed the program and called forth much praise of the thoughtful and efficient manner in which everything has been arranged by Mrs. Hall and her very capable and courteous helper, Miss Pace, of the Cincinnati Chamber of Commerce.

Manufacturers' Exhibits

The Manufacturers' Division Exposition of Quarry Equipment, Machinery and Supplies was formally opened at 7:30 P. M. Monday. The number of exhibitors and the quality of their exhibits were greater than ever before. Certainly they drew a greater attendance due in part to a contest conducted by the association.

Each active member, upon registration, was given a card with numbered spaces in which were to be pasted stickers from the various booths, each booth having a different number. Each member on filling his card was entitled to vote for the best exhibit and was given an opportunity to win one of ten prizes.

The exhibit of the General Electric Co. won first prize, a large silver loving cup, which is to be suitably engraved to commemorate the occasion. The combined exhibit of the Bucyrus-Erie Co. and Woodford Engineering Co. was a close second, getting first honorable mention. The Mack-International Truck Corp. was third.

The active members to win prizes were:

M. Murray, John T. Dyer Quarry Co., a wrist watch;

B. A. McKinney, West Roxbury Trap Rock Co., an ostrich-covered pocket flask;

M. M. Bates, Elmhurst Chicago Stone Co., a marble desk pen set;

F. H. Edwards, Connecticut Quarries Co. Inc., a bronze desk pen set;

N. Phillips, J. T. Dyer Quarry Co., a pen and pencil set;

H. A. Rowan, J. T. Dyer Quarry Co., a pen and pencil set;

Meredith Booll, General Crushed Stone Co., a pen and pencil set;

F. C. Owens, General Crushed Stone Co., a silver flask;

F. M. Howe, Le Roy Lime and Crushed Stone Co., a cigarette lighter;

Lyle Karch, John W. Karch Stone Co., a pen and pencil set.

List of Exhibitors and Descriptions of Exhibits

Allis-Chalmers Mfg. Co., Milwaukee, Wis., literature on general crushing and screening equipment, especially the vibrating screen and Newhouse crusher. Two special busses were run on Tuesday afternoon to the Allis-Chalmers plant at Norwood where a 10-in. Newhouse crusher and vibrating screen in operation were on exhibition. Seventy-five people took advantage of this trip and were tendered a dinner on the mezzanine floor of the hotel followed by entertainment and light refreshments.

American Manganese Steel Co., Chicago Heights, Ill., exhibited operating model of pan feeder, gear reducer driven, a miniature steam shovel dipper and dipper teeth. Also literature and photos of various items of equipment.

Atlas Power Co., Wilmington, Del., advertising literature.

Bacon, Earle C., Inc., New York, N. Y., two hand painted displays showing exterior and cross section of jaw crusher, small operating model of Style B jaw crusher, literature and photos.

Bethlehem Steel Co., Bethlehem, Pa., exhibited frog and switch material, including steel ties, switch stands and frogs in various sizes. Also hollow drill steel, a moving electric sign and descriptive literature.

Blaw-Knox Co., Pittsburgh, Pa., miniature stiff-leg derrick with clamshell bucket, miniature models of other types of clamshells, photos of bin installations and descriptive literature.

Bucyrus-Erie Co., South Milwaukee, Wis., and **Woodford Engineering Co., Chicago, Ill.,** combined exhibit. Showed miniature model of quarrying operation 1/16 size, with quarry face and crusher house. A model 4-cu. yd. 120 B full-revolving, all-electric Bucyrus-Erie crawler shovel operated by full sized controls loaded stone into three 20-cu. yd. Woodford cars, operated from miniature controls. These cars carried the stone to the crusher house where they were dumped by an electric car dump. A model of the obsolete railroad type steam shovel was placed in the quarry for comparison of working ranges.

Union Explosives Co., Clarksburg, W. Va., exhibited raw materials making up explosives with all of ingredients in correct proportions, photos and literature.

U. S. Bureau of Mines, Washington, D. C., featured suggestions for reducing accidents with explosives, particularly in electric blasting, charging and firing. Set ups showed hazards of sharp rock in tamping holes. Featured short circuiting of legs of electric detonator.

U. S. Bureau of Public Roads, Washington, D. C., literature.

Vulcan Iron Works, Wilkes-Barre, Pa., descriptive literature.

Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa., drum controllers for a. c. and d. c. motors, Grid-Glow tube and descriptive literature.

Williams Patent Crusher and Pulverizer Co., St. Louis, Mo., model of pusher type hammer crusher for wet and muddy rock. Descriptive literature.

Marion Steam Shovel Co. exhibited two chrome vanadrim steel dipper teeth, one worn and one new. Each contestant was allowed one guess as to how many tons of rock the worn tooth had handled.

The **Mack Company** in cooperation with the **Easton Company** exhibited a truck and body and each contestant was allowed a guess as to the weight of the body. J. R. Callanan, Callanan Road Improvement Co., won first prize, a leather Gladstone bag. Frank Jones, General Crushed Stone Co., won second prize, an all-leather golf bag.

Buffalo Wire Works, Buffalo, N. Y., samples of all sizes and types of wire screen cloth and descriptive literature.

Burrell Engineering and Construction Co., Chicago, Ill., literature.

Chicago Pneumatic Tool Co., New York, N. Y., full line of drifter and sinker drills including Model CP5, CP10, CP6 and CP8, in both wet and dry types. Also a Boyer riveter, a Little Giant electric drill, accessories and descriptive literature.

Cleveland Rock Drill Co., Cleveland, O., exhibited sinker drills, paving breakers, clay digger, drifter drill, trench digger, backfill tapper, calking tool, riveter, miscellaneous accessories and descriptive literature.

Cross Engineering Co., Carbondale, Pa., sample of all types and sizes of perforated metal screen cloth with descriptive literature.

Detachable Bit Corp. of America, New York City, exhibited detachable air drill bits consisting of drill rod, coupling and bit. Bit of alloy steel is thrown away after using. Descriptive literature.

E. I. du Pont de Nemours and Co., Wilmington, Del., gave out copies of blasting handbook, pipes, and instructive and descriptive literature.

Easton Car and Const. Co., Easton, Pa., operating models Phoenix type and one-way dump bodies and cars, moving pictures showing bodies in operation, photos and descriptive literature. Had full-sized heavy duty one-way dump body on 6-wheel Mack truck chassis on exhibition in street near hotel.

Fate-Root-Heath Co. (Plymouth Locomotive Works), Plymouth, O., photos and descriptive literature of all models and types of gasoline and diesel-driven locomotives from 2½ to 60 tons.

Frog, Switch And Mfg. Co., Carlisle, Pa., manganese steel chains, sheaves, dipper teeth and other shovel and dredge parts. Also descriptive literature.

Gardner-Denver Co., Denver, Colo., model DS3A drill sharpener, Model 17 derrick rig drill, hand drills and pavement breakers. Display of hand drill parts and two sizes of line oilers for any air tool. Descriptive literature.

General Electric Co., Schenectady, N. Y., main feature a miniature electric train operated by voice control with a photo-electric control through a thyratron tube which lights an electric sign from the headlight of the locomotive without the use of any relays or switches. Also showed a streamer discharge argon tungsten equipment showing behavior of small negatively charged particles of tungsten in an electric arc. Also a photo-electric meter for measuring light intensity.

Good Roads Machinery Co., Kennett Square, Pa., quarter-size miniature working model of No. 1030 roller-bearing fine-reduction crusher, samples of crusher-run stone, photos of plant installations and descriptive literature.

Harnischfeger Corp., Milwaukee, Wis., miniature model of Model 600 full-revolving crawler shovel, complete set of operating photographs and descriptive literature.

Hayward Co., New York City, models of Classes E and K clamshell buckets and dragline bucket, and moving pictures of buckets in actual use. Descriptive literature.

Heisler Locomotive Works, Erie, Pa., miniature models of Heisler geared locomotive and drive assembly. Descriptive literature and photos.

Hendrick Manufacturing Co., Carbondale, Pa., Weston testing screen which is to be presented to the association for use in its Washington laboratory. A high carbon steel plate from a vibrating screen which handled 80,000 tons of New Jersey trap rock and will be used again next season. Also samples of other types of screen plate, floor gratings and stair treads.

Hercules Powder Co. exhibited Hercomite cartridge suspended in midair with no apparent support. Gave out table of yardage for various spacings and depths. Distributed copies of Explosives Engineer and blasting handbook.

Ingersoll-Rand Co., New York City, Class D steel sled mountings with x71 pneumatic drill, air hoist, hand winch and steel extension holder for long steel. Also X59, S49 and R39 Jackhamers, Class D lubricator for drifter drills, and descriptive literature.

Kennedy-Van Saun Manufacturing and Engineering Corporation, New York City, miniature operating model of ball-bearing gearless five-reduction secondary crusher with self-contained synchronous motor and spring release for passing tramp steel. Also descriptive literature of new worm-driven ball mill for coal grinding.

Kensington Steel Co., Chicago, Ill., manganese steel castings, crusher parts and concaves, chains, crawler links, dipper teeth, pulverizer parts, car wheels, elevator buckets and a newly developed renewable tooth sprocket.

Kystone Driller Co., Beaver Falls, Pa., photos and literature on complete line of well drills.

Keystone Lubricating Co., Philadelphia, Pa., pneumo-electric system Keystone safety lubricator, various greases and descriptive literature.

Koppel Industrial Car and Equipment Co., Koppel, Pa., photos and descriptive literature on all type of quarry dump cars.

Link-Belt Co., Chicago, Ill., small operating model vibrating screen, double herringbone gear speed reducer with interior exposed and driven slowly by small electric motor, several sizes and types of conveyor idlers and bucket elevator chain, photos and descriptive literature.

Linn Manufacturing Co.. Morris, N. Y., moving pictures of Linn tractor in quarry using Easton stationary dump bodies, photos and descriptive literature.

Loomis Machine Co., Tiffin, Ohio, section of new steel frame used in clipper drill, made of ship channel welded and electric riveted. Also photos of drills in operation and descriptive literature.

MacLanahon and Stone Machine Co., Hollidaysburg, Pa., miniature operating model of log washer, one-third size operating model of 21-in. diameter single-roll crusher and two-fifths size model shaker screen. Descriptive literature.

Mack-International Truck Corp., Philadelphia, Pa., photos of Mack trucks with heavy bodies for quarry haulage and lighter bodies for delivery, locomotives of various sizes and types. Also exhibited a six-wheel truck with Easton Phoenix body on street near hotel. A guessing contest held in connection with this truck is described in another part of this article.

Manganese Steel Forge Co., Philadelphia, Pa., display of Rol-man manganese steel screens of various sizes, plates for lining chutes and spouts, pins and bushings. Also a complete new line of literature.

Marion Steam Shovel Co., Marion, Ohio, photos of shovels in operation, descriptive bulletins and a pair of chrome vanadium steel dipper teeth which all formed a part of the contest described in another part of this article.

National Malleable and Steel Castings Co., Cleveland, Ohio, Naco steam shovel chain, repair links and descriptive literature.

National Safety Council, Chicago, Ill., safety bulletins and current copies of various safety periodicals.

Niagara Concrete Mixer Co., Buffalo, N. Y., full size half-section of 6-ft. by 8-ft. scalper with 4½-in. openings, and a half-section of a 3-ft. by 6-ft. scalper with 2-in. openings, miscellaneous bearings and descriptive literature.

Nordberg Manufacturing Co., Milwaukee, Wis., photos, diagrams and descriptive literature on all sizes of cone crusher.

Ohio Power Shovel Co., Lima, O., photos of Lima 101 shovel, dragline and crane, roller-bearing equipped throughout. Descriptive literature.

Osgood Company, Marion, O., complete line of descriptive literature.

Pit and Quarry, Chicago, Ill., copies of 1929 Annual Engineering and Review number and perforated notebook miniatures of Pit and Quarry.

Robins Conveying Belt Co., New York City, full size operating model Gyrex double-deck screen assembly, various types of conveyor idlers including rubber covered, squeegee rubber belt cleaner, photos of apron feeder, cataract grizzly and other equipment.

Rock Products, Chicago, Ill., copies of magazine distributed.

Ross Screen and Feeder Co., New York City, miniature operating models of chain feeder, feeder screen and feeder grizzly with diagrams and descriptive literature.

Sanderson-Cyclone Drill Co., Orville, O., complete descriptive literature.

Sauerman Bros., Inc., Chicago, Ill., miniature crescent scraper, catalogs and descriptive literature.

Orville Simpson Co., Cincinnati, O., full size Rotex screens; No. 46 single-deck 3 ft. by 7 ft. operating at slow speed with exposed mechanism; similar type and No. 61 single-deck, 4 ft. by 8 ft., operating at normal speed. Also miscellaneous parts and blueprints.

Stearns Conveyor Co., Cleveland, O. (Division Chain Belt Co.), samples of conveyor idlers, Rex chain, sprockets and elevator buckets, with photos and literature.

Stephens-Adamson Manufacturing Co., Aurora, Ill., featured new vibrator screen with lighted photo display and cross-sectional drawings, also J. F. S. speed reducer, Simplex conveyor idler and miniature operating model of box car loader. Descriptive literature.

Taylor-Wharton Iron and Steel Co., High Bridge, N. J., manganese steel elevator and conveyor chain, dipper teeth, pulverizer hammers, elevator buckets, jaw plates, pinions, tractor links, dredge buckets and Timang screen cloth. Literature.

Thew Shovel Co., Lorain, O., photos and literature of all sizes of shovels from ½ cu. yd. to 1 cu. yd. capacity and a locomotive crane.

Troco Lubricating Co., Philadelphia, Pa., lubricating greases for all types of machinery. Descriptive literature.

Traylor Enginering and Manufacturing Co., Altentown, Pa., descriptive literature on jaw, gyratory and roll crushers and revolving screen.

Traylor Vibrator Co., Denver, Colo., operating model new dewatering screening conveyor, 2½ ft. by 6 ft. with turnover section for washing stone. Descriptive literature.

W. S. Tyler Co., Cleveland, O., type 60 Hum-mer single-deck vibrating screen, heavy-duty type, many installation photos, testing sieves, and literature.

Following is a complete registration list:

Active Members

Adams, C. G., France Stone Co., Toledo, O.
Adams, W. J., Cushing Stone Co., Schenectady, N. Y.
Albright, R. H., Grove City Limestone Co., Grove City, Pa.
Allen, H. B., The General Crushed Stone Co., Philadalphia, Pa.
Altgelt, Max A., New Braunfels Limestone Co., New Braunfels, Texas.
Andrew, A. M., Cerulean Stone Co., Cerulean, Ky.
Andrews, W. M., Lake Erie Limestone Co., Youngstown, Ohio.
Atwood, E. R., Old Colony Crushed Stone Co., Quincy, Mass.
Babcock, B. R., The Callanan Road Imp. Co., South Bethlehem, N. Y.
Bair, H. E., The France Stone Co., Toledo, Ohio.
Barres, A. G., General Crushed Stone Co., Easton, Pa.
Bates, M. M., Elmhurst Chicago Stone Co., Elmhurst, Ill.
Beam, C. C., C. C. Beam, Inc., Melvin, Ohio.
Beam, J. B., Sunbeam Quarries Co., Clermont, Ky.
Beam, P. F., C. C. Beam, Inc., Reesville, Ohio.
Beam, T. J., Sunbeam Quarries Co., Clermont, Ky.
Bibb, F. T., Genesee Stone Products Corp., Batavia, N. Y.
Billman, H. E., Rock Hill Quarries, St. Louis, Mo.
Buehl, E. J., Kelley Island L. & T. Co., Cleveland, Ohio.
Blakeslee, M. G., New Haven Trap Rock Co., New Haven, Conn.
Bonnell, L. C., F. R. Upton, Inc., Newark, N. J.
Bovee, Meredith, General Crushed Stone Co., Syracuse, N. Y.
Boxley, L. J., W. W. Boxley & Co., Roanoke, Va.
Boyd, J. R., Nat'l Crushed Stone Ass'n, Washington, D. C.
Brandon, H. H., C. C. Beam Co., Piqua, Ohio.
Brennan, J. G., Lambertville Trap Rock Co., Lambertville, N. J.
Brewer, R. D., The Conn. Quarries Co., Inc., New Haven, Conn.
Browning, W. W., The Wood Co. Stone & Construction Co., Bowling Green, Ohio.
Buchholtz, C. L., Genesee Stone Products Corp., Batavia, N. Y.
Caldwell, A. B., Genessee Stone Products Co., Batavia, N. Y.
Callanan, J. R., Callanan Road Imp. Co., South Bethlehem, N. Y.
Carswell, W. B., Consumers Nat'l Corp., Kansas City, Mo.
Cartwright, L. R., Mid-West Rock Products Corp., Indianapolis, Indiana.
Clark, C. L., Ohio Crushed Stone Assn., Columbus, Ohio.
Clark, Harvey N., Dolomite Products Co., Rochester, N. Y.
Cook, W. H., Saluda Crushed Stone Co., Greenville, S. C.
Cooke, J. H., The Hartford Sand & Stone Co., Hartford, Conn.
Cooke, T. C., Lynn Sand & Stone Co., Swampscott, Mass.
Cove, Thos. L., Buffalo Crushed Stone Co., Buffalo, N. Y.
Cox, H. R., General Crushed Stone Co., Watertown, N. Y.
Cramer, Fred W., York Valley Lime & Stone Co., York, Pa.
Crawley, J. J., Orange Quarry Co., West Orange, N. J.
Croll, L. M., General Crushed Stone Co., Phelps, N. Y.
Crown, Irving, Material Service Corp., Chicago, Ill.
Crumm, A. E., France Stone Co., Toledo, Ohio.
Cushing, J. C., Cushing Stone Co., Inc., Schenectady, N. Y.
Cushing, J. E., Cushing Stone Co., Schenectady, N. Y.
Custis, W. V., C. C. Beam, Inc., Wilmington, Ohio.
Davies, Beulah, National Crushed Stone Ass'n., Washington, D. C.
Davis, E. Q., Marble Cliff Quarries Co., Columbus, Ohio.
Davis, H. H., France Stone Co., Mansfield, Ohio.
De Sandre, John, Conn. Quarries Co., Inc., Meriden, Conn.
Dietschler, Oliver C., General Crushed Stone Co., Akron, N. Y.
Dietschler, Oliver C., General Crushed Stone Co., Easton, Pa.
Dokoff, Kally, Saluda Crushed Stone Co., Carter, Ky.
Dotter, E. E., General Crushed Stone Co., Quakertown, Pa.
Duff, W. W., Union Limestone Co., New Castle, Pa.
Earl, Elmer, Eastern Rock Products Co., Oriskany Falls, N. Y.
Earnshaw, Fred O., The Carbon Limestone Co., Youngstown, Ohio.
Edwards, Fred H., The Conn. Quarries Co., Inc., New Haven, Conn.
Eikel, E., Dittlinger Lime Co., New Braunfels, Tex.
Eschelman, H. H., J. T. Dyer Quarry Co., Norristown, Pa.
Evans, E. E., The Whitehouse Stone Co., Toledo, Ohio.
Evans, Frank, John T. Dyer Quarry Co., Norristown, Pa.
Evans, Mrs. G. M., Monan Crushed Stone Co., LaFayette, Ind.
Eyermann, W. J., Eyermann Contracting Co., St. Louis, Mo.
Faylor, E. W., General Crushed Stone Co., Glen Mills, Pa.
Faylor, G. W., General Crushed Stone Co., Pt. Deposit, Md.
Foote, W. E., Wickwire Spencer Steel Co., Gasport, N. Y.
Gager, J. M., Gager Lime Mfg. Co., Chattanooga, Tenn.
Gaut, Chas. H., American Lime Stone Co., Mascot, Tenn.
Gilbert, Ellwood, New Castle Lime & Stone Co., New Castle, Pa.
Gilbertson, G. R., Hagersville Contracting, Hagersville, Ont.
Gilchrist, Jno., New York Trap Rock Corp., Newburgh, N. Y.
Goldbeck, A. T., Nat'l Crushed Stone Ass'n, Washington, D. C.
Gould, E. M., Marquette Cement Mfg. Co., Cape Girardeau, Mo.
Graves, O. M., General Crushed Stone Co., Easton, Pa.
Gray, J. E., N. C. S. A., Washington, D. C.
Gray, L. B., Eastern Rock Products, Inc., Utica, N. Y.
Gray, Downey M., Louisville Cement Co., Louisville, Ky.
Greer, M. P., Marquette Cement Mfg. Co., Cape Girardeau, Mo.
Gucker, F. T., J. T. Dyer Quarries Co., Norristown, Pa.
Gumpert, A. H., J. T. Dyer Quarries Co., Norristown, Pa.
Hadlow, Doris E., Nat'l Crushed Stone Ass'n, Washington, D. C.
Hahn, Ed., J. T. Dyer Quarries Co., Norristown, Pa.
Hall, A. A., The Ohio Marble Co., Piqua, Ohio.
Hall, Mrs. A. A., Ohio Marble Co., Piqua, Ohio.
Hammerschmidt, G. F., Elmhurst Chicago Stone Co., Elmhurst, Ill.
Hawthorne, J. D., General Crushed Stone Co., Akron, N. Y.
Heim, P. E., The Carbon Limestone, Youngstown, Ohio.
Heidenrich, E. L., Jr., New York Trap Rock Corp., Newburgh, New York.

Heimlich, J. L., LeRoy Lime & Crushed Stone Corp., LeRoy, N. Y.
Hickey, D. C., The General Crushed Stone Co., Syracuse, N. Y.
Hilliard, Wm. E., New Haven Trap Rock Co., New Haven, Conn.
Hinds, W. J., General Crushed Stone Co., Syracuse, N. Y.
Hipple, John A., Penn. Limestone & Cement Co., Rheens, Pa.
Holstein, Lewis, J. T. Dyer Quarry Co., Norristown, Pa.
Hooker, A. J., Buffalo Crushed Stone Co., Buffalo, N. Y.
Howe, F. M., LeRoy Lime & Crushed Stone Co., LeRoy, N. Y.
Hunter, C. M., Pounding Mill Quarry Corp., Pounding Mill, Va.
Hunter, C. M., Jr., Pounding Mill Quarry Corp., Pounding Mill, Virginia.
Jackson, H. T., Consumers Material Corp., Kansas City, Mo.
Jackson, J. H., Carbon Limestone Co., Youngstown, Ohio.
Jacobs, M. L., Bethlehem Mines Corp., Bethlehem, Pa.
Jacoby, P. H., General Crushed Stone Co., White Haven, Pa.
Johnston, H. A., The Old Colony Crushed Stone Co., Quincy, Massachusetts
Jones, Frank S., The General Crushed Stone Corp., Easton, Pa.
Jones, J. H., The Marble Cliff Quarries Co., Athens, Ohio.
Kaiser, J. H., Solvay Sales Corp., Syracuse, N. Y.
Karch, Geo. E., The Jno. W. Karch Stone Co., Celina, Ohio.
Karch, Lisle, The Jno. W. Karch Stone Co., Celina, Ohio.
Karch, Paul A., The Jno. W. Karch Stone Co., Celina, Ohio.
Kawaske, Jno., Callanan Prod. Imp. Co., South Bethlehem, N. Y.
Keinard, C. E., The J. T. Dyer Quarry Co., Norristown, Pa.
Kelleher, P. J., New York Trap Rock Co., Verplants, N. Y.
Kelley, Wm. A., The J. T. Dyer Quarry Co., Norristown, Pa.
Kieffer, Wm., Columbia Quarry Co., St. Louis, Mo.
Kirkpatrick, L. W., Orange Quarry Co., West Orange, N. J.
Klaus, C. E., Columbia Quarry Co., Columbia. Ill.
Knoblauch, C. G., National Lime & Stone Co., Findlay, Ohio.
Kohl, Henry, New York Trap Rock Corp., Newburgh, N. Y.
Krause, E. J., Columbia Quarry Co., St. Louis, Mo.
Krause, H. C., Columbia Quarry Co., St. Louis, Mo.
Kriege, H. F., France Stone Co., Toledo, Ohio.
Lane, A. S., John S. Lane & Son, Inc., Springfield, Mass.
Lanagan, T. A., General Crushed Stone Co., Winchester, Mass.
Latham. C. H., The Hartford Sand & Stone Co., West Hartford, Conn.
Lemieux, E. C., Gopher Stone Co., Minneapolis, Minn.
Lenzie, Geo. W., Material Service Corp., Chicago, Ill.
Long, Frank J., West Roxbury Trap Rock Co., Boston, Mass.
Lovell, C. W., Ky. Con. Stone Co., Louisville, Ky.
Lumsden, A. W., W. W. Boxley & Co., Pembroke, Va.
Manchester, W. D., The Lynn Sand & Stone Co., Swampscott, Massachusetts.
Margraf, W. H., The Marble Cliff Quarries Co., Columbus, Ohio.
McHenry, W. S., New York Trap Rock Corp., Haverstraw, N. Y.
McKeon, M. V., General Crushed Stone Co., Winchester, Mass.
McKinney, Bernard A., West Roxbury Trap Rock Co., Boston, Mass.
McLaughlin, F. F., The General Crushed Stone Co., Syracuse, N. Y.
McMahon, E. J., St. Louis Quarrymen's Ass'n, St. Louis, Mo.
McRae, W. T., Dufferin Paving & Crushed Stone, Ltd., Toronto, Canada.
McThenia, A. W., Acme Limestone Co., Alderson, W. Va.
McCall, E. W., Tarbox-McCall Stone Co., Findlay, Ohio.
McCall, Mrs. J. A., Tarbox-McCall Stone Co., Findlay, Ohio.
Meshberger, Harry, Meshberger Bros. Stone Co., Lima Grove, Ind.
Mobly, J. H., Olive Hill Limestone Co., Olive Hill, Ky.
Millard, R. F., The J. T. Dyer Quarry Co., Norristown, Pa.
Miller, L. F., New York Trap Rock Corp., Haverstraw, N. Y.
Miller, W. L., Mid-West Rock Products Corp., Greencastle, Ind.
Miller, W. S., New York Trap Rock Corp., Tomkins Cove, N. Y.
Moulton, W. T., Jr., Boscobel Granite Quarries Co., Richmond, Va.
Munson, C. A., New Haven Trap Rock Co., New Haven, Conn.
Murphy, Fred C., Ill. Elec. Limestone Co., St. Louis, Mo.
Murphy, Grover J., General Crushed Stone Co., Little Falls, N. Y.
Murray, Maurice, The J. T. Dyer Quarry Co., Norristown, Pa.
Nettleton, E. T., Connecticut Quarries, Inc., New Haven, Conn.
Nunson, Jno., Mid-West Rock Products Corp., Greencastle, Ind.
Odenbach, J. H., Dolomite Co., Rochester, N. Y.
Olson, H. O., Franklin Limestone Co., Nashville, Tenn.
Owns, A. S., Eastern Rock Products, Inc., Utica, N. Y.
Owens, F. C., General Crushed Stone Co., Syracuse, N. Y.
Patterson, Allen, National Limestone Co., Findlay, Ohio.
Patterson, F. R., National Lime & Stone Co., Findlay, Ohio.
Paynter, W. B., Kentucky Virginia Stone Co., Middlesboro, Ky.
Perry, Edw. T., New Haven Trap Rock Co., Providence, R. I.
Petzel, C. L., New York Trap Rock Corp., Newburgh, N. Y.
Phillips, Nick, The J. T. Dyer Quarry Co., Norristown, Pa.
Pritchett, W. B., J. T. Dyer Quarry Co., Norristown, Pa.
Putmann, L. H., General Crushed Stone Co., Watertown, N. Y.
Quinn, Wm. F., Conn. Quarries Co., New Haven, Conn.
Reid, M. E., Conn. Quarries Co., New Haven, Conn.
Reinhold, P. B., Reinhold & Co., Inc., Pittsburgh, Pa.
Rex, B. P., General Crushed Stone Co., Easton, Pa.
Rice, John, General Crushed Stone Co., Easton, Pa.
Rice, Jno., Jr., General Crushed Stone Co., Easton, Pa.
Robinson, H. O., Greenfield Mass. Broken Stone Co., Greenfield, Mass.
Robinson, Ralph M., Greenfield Mass. Broken Stone Co., Meriden, Conn.
Robinson, Lawrence, Greenfield Mass. Broken Stone Co., Greenfield, Mass.
Rodes, H. E., Franklin Limestone Co., Nashville, Tenn.
Rodes, A. B., Franklin Limestone Co., Nashville, Tenn.
Rorey, Russell, Marble Cliff Quarries Co., Columbus, Ohio.
Rose, Robt. S., Conn. Quarries Co., New Haven, Conn.
Rowan, Henry A., J. T. Dyer Quarry Co., Norristown, Pa.
Saffel, D. W., Greer Limestone Co., Morgantown, W. Va.
Santeo, Wm. J., Trumbower Co., Nazareth, Pa.
Savage, James, Buffalo Crushed Stone Co., Buffalo, N. Y.
Savage, A. S., Buffalo Crushed Stone Co., Buffalo, N. Y.
Stolle, Carl A., Casper Stolle Quarry & Cement Co., East St. Louis, Ill.
Travilla, Chas. C., Pilot Knob Ore Co., St. Louis, Mo.
Spencer, R. G., National Lime & Stone Co., Findlay, Ohio.
Taylor, C., K. O. L. & T. E., Cleveland, Ohio.
Tyler, R. B., National Rock Asphalt Co., Louisville, Ky.
Schaefer, Geo. E., General Crushed Stone Co., Rochester, N. Y.
Schmatz, A. H., Eyermann Contracting Co., St. Louis, Mo.
Schmidt, F. W., Jr., North Jersey Quarry Co., Morristown, N. J.
Schmidt, John H., North Jersey Quarry Co., Morristown, N. J.
Schwartz, Harry, J. T. Dyer Quarry Co., Norristown, Pa.
Scott, A. L., General Crushed Stone Co., LeRoy, N. Y.
Scott, Coulter, General Crushed Stone Co., Cayenomia, N. Y.
Scrivener, R. M., Dufferin Paving & Crushed Stone, Ltd., Toronto, Canada.
Shauck, Ruth E., Nat'l Crushed Stone Ass'n, Washington, D. C.
Shouse, C. A., Consumer's Material Corp., Kansas City, Mo.
Seitz, A. G., General Crushed Stone Co., Syracuse, N. Y.
Sink, J. C., The Jno. W. Karch Stone Co., Celina, Ohio.
Souders, E. G., J. T. Dyer Quarry Co., Norristown, Pa.
Sparks, W., Cedar Bluff Quarry, Princeton, Ky.
Stephens, J., Canada Crusher, Hamilton, Ont.
Stone, W. E., Ohio Marble Co., Piqua, Ohio.
Stull, Jno. W., Liberty Lime & Stone Co., Rocky Pt., Va.
Taylor, E. B., Mid-West Rock Prod. Corp., Indianapolis, Ind.
Taylor, J. Q., New York Trap Rock Corp., Stoneco, N. Y.
Tomlins, Greer, New York Trap Rock Corp., Haverstraw, N. Y.
Townsend, L. E., Ohio Marble Co., Piqua, Ohio.
Van Camp, B. T., Van Camp Stone Co., Cincinnati, Ohio.
Watson, D. Roy, Canada Crushed Stone Corp., Ltd., Hamilton, Ont.
Weber, J. E., Casper Stolle Quarry & Const. Co., E. St. Louis, Mo.
Weerts, E. H., Monarch Stone Co., Tulsa, Okla.
Weiman, W. J., General Crushed Stone Co., Auburn, N. Y.
Westbrook, C., Landa Rock Products Co., New Braunfels, Tex.
Weston, T. I., The Weston & Brooker Co., Columbia, S. C.
Weston, W. S., The Weston & Brooker Co., Columbia, S. C.
Wise, W. F., Southwest Stone Co., Dallas, Tex.
Worthen, A. L., Conn. Quarries Co., New Haven, Conn.
Wortman, I. W., North Jersey Quarry Co., Morristown, N. J.
Wunder, John, Trap Rock Co., Minneapolis, Minn.
Yotter, H. F., General Crushed Stone Co., Easton, Pa.

Associate Members

Adamson, C. H., Stephens Adamson Mfg. Co., Aurora, Ill.
Ainlay, A. E., Fate Root Heath Co., Cleveland, Ohio.
Andrews, C. B., Taylor-Wharton Iron & Steel Co., High Bridge, New Jersey.
Artz, F. E., Marion Steam Shovel Co., Marion, Ohio.
Ashcraft, H. E., Union Explosives Co., Clarksburg, W. Va.
Austin, W. J., Hercules Powder Co., Chicago, Ill.
Abeles, Chas., Koppel, Ind. Car. & Equip. Co., New York, N. Y.
Barnhart, Henry F., Ohio Power Shovel Co., Lima, Ohio.
Barnitz, Fred, Mack Truck Co., Philadelphia, Pa.
Bingham, C. T., W. S. Tyler Co., Cleveland, Ohio.
Burton, J. S., Burton Explosive Sales Co., Cleveland, Ohio.
Barab, J., Hercules Powder Co., Wilmington, Del.
Barber, F. D., Simplicity Engr. Co., Durand, Mich.
Bassler, A. H., Ill. Powder Mfg. Co., St. Louis, Mo.
Bateman, J. H., Bethlehem Steel Co., Bethlehem, Pa.
Bauer, Eugene C., Kensington Steel Co., Chicago, Ill.
Beglinger, R. T., Allis-Chalmers Mfg. Co., Pittsburgh, Pa.
Behnke, Geo. W., Simplicity Engr. Co., Durand, Mich.
Beebe, Lucius, Troco Lub. Co., Philadelphia, Pa.
Benedict, C. L., Chicago Pneumatic Tool Co., Knoxville, Tenn.
Birckhead, P. H., Bucyrus Erie Co., S. Milwaukee, Wisc.
Blackburn, D. M., Hendrick Mfg. Co., Carbondale, Pa.
Bond, Howard, Williams Crusher Co., St. Louis, Mo.
Bond, J. S., Allis-Chalmers Mfg. Co., Milwaukee, Wisc.
Borland, J. E., Westinghouse Elec. & Mfg. Co., East Pittsburgh, Pa.
Bridges, M. N., The Linn Mfg. Corp., Morris, N. J.
Broan, Wm., Ingersoll-Rand Co., Chicago, Ill.
Brown, Edwin, Co., Good Roads Machinery, Kennett Square, Pa.
Buchanan, Gordon, G. Buchanan & Co., Inc., New York, N. Y.
Budd, M. R., The Explosives Engineer, Wilmington, Del.
Cheney, D. L., The Marion Steam Shovel Co., Buffalo, N. Y.
Cheyette, D. A., Traylor Engr. Mfg. Co., Allentown, Pa.
Clark, J. O., Amer. Mang. Steel Co., Chicago Heights, Ill.
Coale, C. H., E. I. du Pont de Nemours & Co., Pittsburgh, Pa.
Colby, A. C., Nordberg Mfg. Co., Milwaukee, Wisc.
Collins, R. T., Ill. Powder Mfg. Co., St. Louis, Mo.
Conant, R. W., Bucyrus-Erie Co., New York City.
Conley, H. H., Union Explosive Co., LeRoy, N. Y.
Cox, I. K., Allis-Chalmers Mfg. Co., New York, N. Y.
Crain, Allan M., The Orville Simpson Co., Cincinnati, Ohio.
Courtright, J. P., Marion Steam Shovel Co., Chicago, Ill.
Crowell, W. E., Am. Tar Products Co., Pittsburgh, Pa.
Crew, J. B., Marion Steam Shovel Co., Marion, Ohio.
Dann, B. G., Hendrick Mfg. Co., New York, N. Y.
Dana, Richard H., Robins Conveying Belt Co., New York, N. Y.
Davison, H. M., Harnischfeger Sales Corp., Milwaukee, Wisc.
Deephouse, L. P., Harnischfeger Sales Corp., Milwaukee, Wis.
Dold, R. N., Chicago Pneumatic Tool Co., Cincinnati, Ohio.
Dyke, Geo. M., The Stearns Conveyor Co., Cleveland, Ohio.
Earnshaw, Geo. M., *Rock Products*, Chicago, Ill.
Edgerton, A. H., Union Explosives Co., Wheeling, W. Va.
Ellis, Wilbur, Kensington Steel Co., Chicago, Ill.
Ellsworth, S. S., Ensign Beckford Co., Simsbury, Conn.
Elmes, Wm., Keystone Driller Co., Beaver Falls, Pa.
Essig, B. C., Gardner-Denver, Denver, Colo.
Fabrizio, E. N., Westinghouse Electric Co., East Pittsburgh, Pa.
Farber, U. G., Michigan Limestone & Chem. Co., Buffalo, N. Y.
Farrell, J. C., Easton Car & Const. Co., Easton, Pa.
Featherstonhaugh, A. C., Blaw-Knox Co., Pittsburgh, Pa.
Fisher, Thomas E., Allis-Chalmers Mfg. Co., New York, N. Y.
Flounders, G. W., C. G. Buchanan Co., Inc., New York, N. Y.
Fraunfelder, G. D., Easton Car Co., Easton, Pa.
Gainty, W. F., Hercules Powder Co., Chicago, Ill.
Garber, M. B., The Thew Shovel Co., Lorain, Ohio.
Garden, Geo., Ill. Powder Mfg. Co., Joliet, Ill.
Gill, Fred A., Gill Rock Drill Co., Lebanon, Pa.
Goldberg, Abe, Allis-Chalmers Mfg. Co., Milwaukee, Wisc.
Graves, T. A., Detachable Bit Corp. of Am., New York City.
Gracely, Harvey T., Marion Steam Shovel Co., Marion, Ohio.
Greensfielder, N. S., Hercules Powder Co., Wilmington, Del.
Guitteau, Wm. B., Sec'y Ohio Crushed Stone Ass'n, Columbus, Ohio.
Hallford, F. J., Canadian Industries, Ltd., Toronto, Ont., Canada.
Hamilton, A. W., Kennedy Van Saun Mfg. Corp., New York, N. Y.
Hamilton, H. H., E. I. de Pont de Nemours & Co., Wilmington, Del.
Hammond, A. D., Atlas Powder Co., Wilmington, Del.
Hance, A. R., Bucyrus Erie Co., Chicago, Ill.
Harsh, Earl C., *Rock Products*, Chicago, Ill.
Harwood, K. B., Mack Motor Truck, New York, N. Y.
Harper, L. M., The Woodford Engr. Co., Chicago, Ill.
Hendson, Thos. F., Thew Shovel Co., Lorain, Ohio.
Hodge, S. C., Niagara Concrete Mixer Co., New York, N. Y.
Horine, M. C., Mack Trucks, New York City.
Hoskin, A. J., PIT AND QUARRY, Chicago, Ill.
Hudson, L. D., Nordberg Mfg. Co., New York, N. Y.
Hudson, L. D., Jr., Nordberg Mfg. Co., New York, N. Y.
Hunter, Frank M., Keith Dunham Co., Chicago, Ill.
Huntington, C. S., Link-Belt Co., Chicago, Ill.
Hughes, A. D., Trojan Powder Co., Allentown, Pa.
Hruby, A. H., Ingersoll Rand Co., Cleveland, Ohio.
Howser, C. M., Marion Steam Shovel Co., Marion, Ohio.
Ingersoll, C. R., Niagara Concrete Mixer Co., Buffalo, N. Y.
Johann, H. A., The Frog Switch & Mfg. Co., Carlisle, Pa.
Johnson, Oliver W., Bethlehem Steel Co., Bethlehem, Pa.
Johnson, S. A., Hercules Powder Co., New York City.
Johnson, W. C., Allis-Chalmers Mfg. Co., New York, N. Y.
Jones, A. C., American Steel & Wire Co., Cincinnati, Ohio.
Jupp, Wm. B., Mack Trucks, Inc., New York, N. Y.
Keane, Roy, Hercules Powder Co., Columbus, Ohio.
Keine, Wm. E., Allis-Chalmers Mfg. Co., New York, N. Y.
Kincaid, M. S., Illinois Powder Mfg. Co., St. Louis, Mo.
Koster, J. W., Du Pont Co., Wilmington, Del.
Krider, G. E., McLanahan Stone Machine Co., Hollidaysburg, Pa.
Kunkle, W. N., Kennedy Van Saun, New York, N. Y.
Lambert, Max S., Robins Conveying Belt Co., Chicago, Ill.
Larsen, V. E., PIT AND QUARRY, Chicago, Ill.
Lease, B. F., The Linn Mfg. Corp., Morris, N. Y.
Lenhart, W. B., *Rock Products*, Chicago, Ill.
Lester, Bernard, Westinghouse Electric Co., New York, N. Y.
Lewis, E. G., Bucyrus-Erie Co., New York City.
Ludwick, H. M., Keystone Lub. Co., Philadelphia, Pa.
Lynch, W. S., Chicago Pneumatic Tool Co., Cincinnati, Ohio.
Lyon, W. B., Hercules Powder Co., Pittsburgh, Pa.
MacBlain, J., E. E. du Pont de Nemours & Co., Sandusky, Ohio.
MacFadgen, L. E., Taylor Wharton I. & S. Co., Philadelphia, Pa.
Mahoney, G. E., Stearns Conveyor Co., Cleveland, Ohio.
MacLachlan, Tom, Vulcan Iron Works, New York City.
MacNeal, B. H., Link Belt Co., Chicago, Ill.
McKee, L. L., National Mall. & Steel Castings Co., Cleveland, Ohio.
McKee, Wesley W., Link Belt Co., Philadelphia, Pa.
McKinley, J. H., Manganese Steel Forge Co., Philadelphia, Pa.
Metlam, Fred A., Detachable Belt Corp., New York, N. Y.
Milroy, W. H., Earle C. Bacon, Inc., New York, N. Y.
Morrisen, Frank J., Niagara Concrete Mixer Co., Cleveland, Ohio.
Mahoney, L. P., E. I. du Pont & Co., Wilmington, Del.
Mitchell, Ed. F., American Manganese Steel Co., Chicago, Ill.
Neely, H. C., Armstrong Mfg. Co.
Newhouse, R. C., Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Nicol, W. S., Cross Engineering Co., Carbondale, Pa.
Nothacker, W. F., Sanderson Cyclone Drill Co., New York, N. Y.
Oldham, E. L., Cleveland Rock Drill Co., New York, N. Y.
O'Neil, Wm. D., Buffalo Wire Works Co., Buffalo, N. Y.
Onkst, B. E., Harnischfeger Sales Corp., Chicago, Ill.
Owen, U. E., Niagara Concrete Mixer Co., Cleveland, Ohio.
O'Neill, Chas. J., E. I. du Pont de Nemours & Co., Chicago, Ill.
Peirson, H. F., W. S. Tyler Co., Cleveland, Ohio.
Patton, E. J., Stephens Adamson Mfg. Co., Aurora, Ill.
Pement, Fred A., Sauerman Bros., Inc., Chicago, Ill.
Peterson, Chas. R., Osgood Co., Marion, Ohio.
Phillips, C. Y., Bethlehem Steel Co., Cincinnati, Ohio.
Phillips, Stanley A., PIT AND QUARRY, Chicago, Ill.
Pietsch, W. Vincent, Earle C. Bacon, Inc., New York City.
Phillips, W. W., E. I. du Pont de Nemours & Co., Cleveland, Ohio.
Potter, W. H., Manganese Steel Forge Co., Philadelphia, Pa.

Post, Ed. M., Mack Truck Co., New York, N. Y.
Provance, K. C., Easton Car & Constr. Co., Easton, Pa.
Redman, H. W., Koppel Ind. Car. & Equip. Co., Chicago, Ill.
Reynard, J., Loomis Machine Co., Tiffin, Ohio.
Ryder, H. C., Hayward Co., New York, N. Y.
Rulford F., Marion Steam Shovel Co., Philadelphia, Pa.
Read, E. C., U. S. Rubber Co., Cincinnati, Ohio.
Richards, Jess, Link Belt Co., Philadelphia, Pa.
Riggs, C. A., The Loomis Mach. Co., Tiffin, Ohio.
Rockwood, Nathan C., *Rock Products*, Chicago, Ill.
Root, R. R., Nat'l Malleable & Steel Cas. Co., Cleveland, Ohio.
Ross, J. E., Bethlehem Steel Co., Bethlehem, Pa.
Ross, Wm., Ross Screen & Feeder Co., New York City.
Ruddy, Thomas A., Stephens Adamson Mfg. Co., Chicago, Ill.
Ruhloff, F. C., Bucyrus-Erie Co., South Milwaukee, Wisc.
Runkle, K. H., General Electric Co., Schenectady, N. Y.
Russell, S. R., E. I. du Pont de Nemours & Co., Wilmington, Del.
Saiple, S. C., Kennedy Van Saun Mfg. Co., New York, N. Y.
Sanders, R. W., Detachable Bit Corp., New York, N. Y.
Schifflin, A. K., Link Belt Co., Chicago, Ill.
Schroeder, G., The Woodford Eng., Chicago, Ill.
Seaman, C. L., Cleveland Rock Drill Co., New York, N. Y.
Selleg, L. H., Westinghouse Elec. Mfg. Co., Milwaukee, Wisc.
Shotton, B. G., Hendrick Mfg. Co., Pittsburgh, Pa.
Shugg, L. W., General Electric Co., Schenectady, N. Y.
Silva, C. E., Marion Steam Shovel Co., Marion, Ohio.
Simpson, Lowe, The Orville Simpson Co., Cincinnati, Ohio.
Smith, E. C., The Osgood Company, Marion, Ohio.
Srodes, H. B., Trojan Powder Co., Chicago, Ill.
Stein, Geo. G., Fate Root Heath Co., Cleveland, Ohio.
Stewart, W. W. Koppel Ind. Car & Equip. Co., Pittsburgh, Pa.
Stoltz, G. E., Westinghouse Elec. Mfg. Co., East Pittsburgh, Pa.
Stone, F. L., General Electric Co., Schenectady, N. Y.
Sullivan, R. C., *Rock Products*, Chicago, Ill.
Summer, Ray H., E. I. du Pont de Nemours & Co., St. Louis, Mo.
Swabb, Frank L., Heisler Locomotive Works, Erie, Pa.
Swanson, C. W., Ill. Powder Mfg. Co., St. Louis, Mo.
Sargent, Chas. S., The Hayward Co., New York, N. Y.
Seals, Vorhees N., Frog Switch & Mfg. Co., Carlisle, Pa.
Shoemaker, A. J., E. I. du Pont de Nemours & Co., Chicago, Ill.
Sittig, A. R., American Manganese Steel Co., Chicago, Ill.
Simpson, R. O., The Orrvile Simpson Co., Cincinnati, Ohio.
Tate, M. K., Lima Power & Shovel Co., Lima, Ohio.
Tennant, P. C., The Texas Co., New York, N. Y.
Thaleg, O. E., Traylor Engr. & Mfg. Co., Chicago, Ill.
Thomas, J. P., Keith Dunham Co., Chicago, Ill.
Tompkins, G. H., Sauerman Bros., Inc., Chicago, Ill.
Thompson, C. S., Harnischfeger Sales Corp., Milwaukee, Wisc.
Trainor, J. A., Taylor Wharton Iron & Steel Co., High Bridge, N. J.
Trauffer, W. E., PIT AND QUARRY, Chicago, Ill.
Thompson, C. F., Harnischfeger Corp., Cincinnati, Ohio.
Tyson, J. R., Bethlehem Steel Co., Bethlehem, Pa.
Waller, S. R., Bucyrus Erie Co., Pittsburgh, Pa.
Watrous, C. B., Nordberg Mfg. Co., Milwaukee, Wisc.
Watters, J. H., Marion Steam Shovel Co., Marion, Ohio.
Webster, Edw., Ross Screen & Feeder Co., New York City.
Wells, J. M., Ingersoll Rand Co., New York City.
Wettlaufer, E. L., Niagara Concrete Mixer Co., Toronto, Ont., Canada.
White, Harold, Atlas Powder Co., Wilmington, Del.
Wigton, Paul, Traylor Vibrator Co., Denver, Col.
Wills, Roy, The Ohio Power Shovel Co., Lima, Ohio.
Wilson, E. R., Marion Steam Shovel Co., Marion, Ohio.
Winship, E. E., Loomis Machine Co., Tiffin, Ohio.
Wolf, Edwin, E. I. du Pont de Nemours & Co., New York City.
Woodford, H. E., The Woodford Eng. Co., Chicago, Ill.
Woodhull, M. J., Bucyrus Erie Co., S. Milwaukee, Wisc.
Wyse, F. O., Bucyrus Erie Co., S. Milwaukee, Wisc.
Wright, J. L., W. S. Tyler Co., Cleveland, Ohio.
Young, Wm. R., Earl C. Bacon, Inc., New York, N. Y.

Guests

Avril, Arthur C., Avril Tru-Batch Concrete, Inc., Cincinnati, O.
Allen, A. L., France Stone Co., Mansfield, Ohio.
Anderson, W. W., State Highway Dept., Ashland, Ohio.
Becker, Ralph C., McGraw Hill Catalog & Directory Co., New York City.
Brandon, Mrs. Harry H., Piqua, Ohio.
Brower, Miss Elizabeth, St. Louis Quarrymen's Ass'n, St. Louis, Mo.
Blake, R. P., Independence Bureau, Philadelphia, Pa.
Burruss, Sales Engineer, Washington, D. C.
Cameron, W. H., Dolomite, Inc., Cleveland, Ohio.
Cooper, M. Y., Governor of Ohio, Columbus, Ohio.
Chambers, A. R., Commercial Stone Co., Pittsburgh, Pa.
Dinsmore, J. W., Pittsburgh Limestone Co., New Castle, Pa.
Davidson, James R., The Cincinnati Quarries Co., Cincinnati, Ohio.
Earnshaw, Mrs. Fred O., The Carbon Limestone Co., Youngstown, Ohio.
Forbes, J. U., U. S. Bureau of Mines, Pittsburgh, Pa.
Geisel, W. H., Jr., Essex Prison Quarry, Caldwell, N. J.
Gornley, M. J., American Ry. Ass'n., Washington, D. C.
Gillette, W. H., Buckeye Machine Co., Lima, Ohio.
Gallagher, C. O., Dolomite, Inc., Cleveland, Ohio.
Howell, Spencer R., U. S. Bureau of Mines, Pittsburgh, Pa.
Hadden, C. C., Ohio State Highway Dept., Columbus, Ohio.
Haver, Fritz, Haver, Boecker, Oelde, Westfalen, Germany.
Jackson, H. F., Bureau Public Roads, Washington, D. C.
Jones, Mrs. J. H., Marble Cliff Quarries Co., Athens, Ohio.
Jackson, Mrs. Joseph H., Carbon Limestone Co., Youngstown, Ohio.
Johann, Mrs. H. A., Chicago, Ill.
Johnston, Mrs. Harry A., Old Colony Crushed Stone Co., Quincy, Mass.
Keine, Devola, New York, N. Y.
Kelley, R. F., Frank Kelley & Son, Fostoria, Ohio.
Kelly, Thos., Indianapolis, Ind.
Kirschner, O. J., Brandies Machinery & Supply Co., Louisville, Ky.
Kennedy, P. B., Cin. Steel Cast. Co., Cincinnati, Ohio.
Langel, P. R., Colgan Limestone Pro. Co., Columbus, Ohio.
Larry, R. E., Pittsburgh Limestone Co., New Castle, Pa.
Lockwood, R. L., U. S. Dept. of Commerce, Washington, D. C.
Lumsden, Mrs. A. W., W. W. Boxley, Pembroke, Va.
MacLachlan, Mrs. Tom, New York, N. Y.
Margraf, Mrs. W. H., Columbus, Ohio.
McThenia, Mrs. A. W., Acme Limestone Co., Alderson, W. Va.
Munsch, Albert A., U. S. Bureau of Mines, Pittsburgh, Pa.
McCall, Mrs. E. W., Tarbox-McCall Stone Co., Findlay, Ohio.
McCall, Mrs. J. A., Tarbox-McCall Stone Co., Findlay, Ohio.
Meckenstock, J. W., Pettibone Mulliken Co., Chicago, Ill.
McCastle, Geo., Federal Trade Commission, Washington, D. C.
Martin, D. B., Sullivan Mchy. Co., Cleveland, Ohio.
Murray, W. A., N. Y. C. R. R., New York, N. Y.
Newbut, J., N. Y. C. R. R., New York, N. Y.
North, A. A., Anna Stone Co., Anna, Ill.
O'Hay, Capt. I., New York, N. Y.
Patterson, Mrs. A., Nat'l. Lime & Stone Co., Findlay, Ohio.
Phillips, Stanley A., Mrs., Chicago, Ill.
Russell, H. J., Jointa Lime Co., Glen's Falls, N. Y.
Scott, J. V., National Safety Council, Chicago, Ill.
Rea, A. S., Ohio State Highway Dept., Columbus, Ohio.
Schoen, Wm. M., American Hoist & Derrick Co., St. Paul, Minn.
Smith, R. H., Ohio State Highway Dept., Columbus, Ohio.
Reynard, Mrs. J., Loomis Mch. Co., Tiffin, Ohio.
Satter, Robt. S., Ohio State University, Columbus, Ohio.
Simpson, R. H., City of Columbus, Columbus, Ohio.
Sparks, Mrs. W. C., Cedar Bluff Quarry, Princeton, Ky.
Swabb, Mrs. Frank L., Heisler Locomotive Works, Erie, Pa.
Tebbs, P. M., Penna. Dept. of Highways, Harrisburg, Pa.
Thistlethwaite, Mrs. J. M., Nordberg Co., Sheridan, Ind.
Thoenen, J. R., U. S. Bureau of Mines, Washington, D. C.
Thompson, Jack, *Manufacturers Record*, Baltimore, Md.
Trauffer, Mrs. W. E., Chicago, Ill.
Travilla, Mrs. Jas. C., Pilot Knob Ore Co., St. Louis, Mo.
Upham, Chas., American Rd. Builders Assn., Washington, D. C.
Weber, Mrs. John E., Caspar Stolle Quarry & Const. Co., East St. Louis, Ill.
Welden, E. G., Connecticut State Highway Commission, Hartford, Conn.
Weston, Mrs. W. S., Weston & Brooker Co., Columbia, S. C.
Williams, Harold, Boston, Mass.
Wilson, Russell, Mayor, City of Cincinnati, Cincinnati, Ohio.

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

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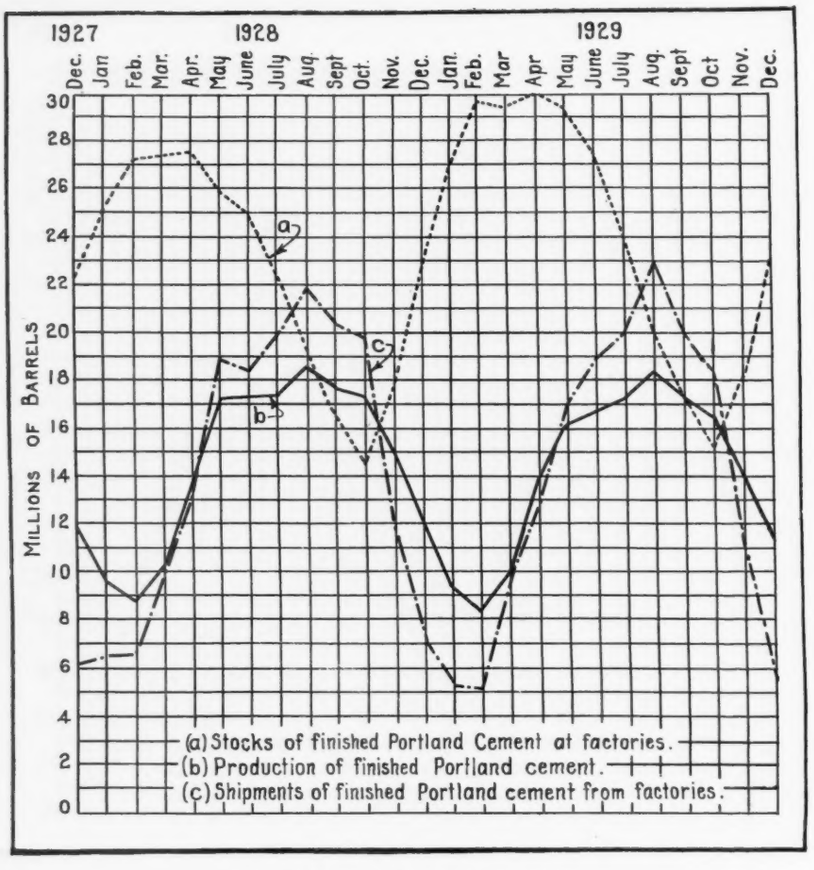
Otho M. Graves

Vice-president and General Manager, General Crushed Stone Company, Easton, Pa.


1927
1928
1929
Dec. Jan Feb. Mar. Apr. May June July Aug. Sept Oct. Nov. Dec. Jan. Feb. Mar Apr May June July Aug. Sept Oct Nov. Dec.
MILLIONS OF BARRELS
30 28 26 24 22 20 18 16 14 12 10 8 6 4 2 0
a
b
c
(a) Stocks of finished Portland Cement at factories.
(b) Production of finished Portland cement.
(c) Shipments of finished Portland cement from factories.

Portland cement in December, 1929

Cement Production For December, 1929

The portland cement industry in December, 1929, produced 11,215,000 barrels, shipped 5,908,000 barrels from the mills, and had in stock at the end of the month 23,519,000 barrels, according to the United States Bureau of Mines, Department of Commerce. The production of portland cement in December, 1929, showed a decrease of 8 per cent and shipments a decrease of 20 per cent, as compared with December, 1928. Portland cement stocks at the mills were 2.6 per cent higher than a year ago.

The preliminary totals for 1929 show decreases of 3.5 per cent in production and 3.7 per cent in shipments from the final totals for 1928 as given on page 5.

The statistics here presented are compiled from reports for December from all manufacturing plants except two for which estimates have been included in lieu of actual returns.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 165 plants at the close of December, 1929, and of 159 plants at the close of December, 1928.

Relation of production to capacity

	December 1928	December 1929	November 1929	October 1929	September 1929
	Per cent	Per cent	Per cent	Per cent	Per cent
The month	60.4	51.5	66.6	77.0	81.8
The 12 months ended	74.0	66.4	66.8	67.3	67.5

Production, shipments, and stocks of finished Portland cement, by districts, in December, 1928 and 1929, and stocks in November, 1929. (In thousands of barrels)

District	December Production 1928	December Production 1929	December Shipments 1928	December Shipments 1929	Stocks at End of month 1928	Stocks at End of month 1929	Stocks at end of Nov. 1929a
Eastern Pa., N. J. and Md	2,760	2,479	1,963	1,323	5,410	5,176	4,020
New York and Maine	812	731	495	294	1,656	1,544	1,107
Ohio, Western Pa. and West Virginia	1,029	940	606	511	2,861	3,010	2,580
Michigan	1,058	1,008	416	246	2,011	2,398	1,636
Wis., Ill., Ind. and Kentucky	1,683	1,445	644	429	2,736	2,885	1,869
Va., Tenn., Ala., Ga., Fla. and La.	1,084	905	870	821	1,859	1,641	1,557
Eastern Mo., Ia., Minn. and S. Dak	1,269	993	359	273	2,880	2,595	1,876
West. Mo., Neb., Kans., Okla. and Ark. (b)	691	976	507	529	1,346	1,456	1,009
Texas	472	593	375	450	522	813	670
Colo., Mont., Utah, Wyo. (b) and Idaho (b)	206	84	68	81	524	456	453
California	909	913	914	813	696	1,090	991
Oregon and Washington	216	148	167	138	417	455	445
	12,189	11,215	7,384	5,908	22,918	23,519	18,213

Production, shipments, and stocks of finished Portland cement, by months, in 1928 and 1929. (In thousands of barrels)

Month	Production 1928	Production 1929	Shipments 1928	Shipments 1929	Stocks at End of Month 1928	Stocks at End of Month 1929
January	9,768	9,881	6,541	5,707	25,116	26,797
February	8,797	8,522	6,563	5,448	27,349	29,870
March	10,223	9,969	10,135	10,113	27,445	29,724
April	13,468	13,750	13,307	13,325	27,627	30,151
May	17,308	16,151	18,986	16,706	25,984	29,624
June	17,497	16,803	18,421	18,949	25,029	(a)27,505
July	17,474	(a)17,315	19,901	(a)20,319	22,580	24,525
August	18,759	18,585	21,970	23,052	19,374	20,056
September	17,884	17,223	20,460	19,950	16,799	17,325
October	17,533	16,731	19,836	18,695	14,579	15,381
November	15,068	(a)14,053	11,951	(a)11,222	17,769	(a)18,213
December	12,189	11,215	7,384	5,908	22,918	23,519
	175,968	170,198	175,455	169,394	.....	.....

Exports and Imports

Compiled from the records of the Bureau of Foreign and Domestic Commerce and subject to revision

Exports of hydraulic cement by countries in November, 1929

Exported to—	Barrels	Value
Canada	2,868	$15,769
Central America	3,852	10,446
Cuba	6,304	17,111
Other West Indies and Bermuda	3,887	8,629
Mexico	17,488	55,942
South America	12,692	53,029
Other countries	6,287	37,271
	53,378	198,197

Imports of hydraulic cement by countries and by districts, in November, 1929

Imports from—	District into which Imported	Barrels	Value
Belgium	Los Angeles	47,900	$26,800
	New Orleans	1,463	1,811
	Oregon	3,000	3,741
	Porto Rico	500	636
	Total	52,863	32,988
Canada	Maine and N. H.	1,383	3,153
Denmark	Porto Rico	20,175	27,192
France	New York	496	1,183
	San Francisco	125	207
	Total	621	1,390
Germany	Los Angeles	1,350	2,574
United Kingdom	New York	16,061	23,645
	Philadelphia	4,115	4,902
	Total	20,176	28,547
	Grand Total	96,568	95,844

Domestic hydraulic cement shipped to Alaska, Hawaii, and Porto Rico, in November, 1929

	Barrels	Value
Alaska	1,076	$ 3,463
Hawaii	29,206	71,274
Porto Rico	5,033	10,235
	35,315	$84,972

Model Dust-Collecting System At Ohio Safety Congress

One of the features of the exhibit made by Northern Blower Company at the Ohio Safety Congress held at Columbus, Ohio, was a working model of a Norblo dust collecting system fitted to a set of miniature buffing lathes, saws, planers, etc. The collecting system included a complete outfit of ducts, exhaust hoods, a cyclone collector, and blast-gates, and enabled the two Norblo representatives, L. L. Eiben and his assistant Mr. Pike, to demonstrate the manner in which dust or shavings can be removed from the air of workshops by air-suction. The method of dealing with dangerous fumes was demonstrated by a complete working model outfit of a chromium plating tank fume removal equipment. In the case of the model, smoke from an incense burner took the place of the invisible and deadly chromic acid fumes met in actual practice.

New Chromite Cement Developed

Botfield Refractories Company, Swanson and Clymer Streets, Philadelphia, Pa., has developed a new high temperature cement which will be added to its line of Adaproducts and sold under the trade name of Adachrome Plastic Super-Cement.

In this new cement, the basic material is an exceptionally high-grade chromite ore obtained from South African deposits.

Because of its chromite base, Adachrome Plastic Super-Cement is chemically-inert, and is also hard, dense and highly refractory. Furthermore, the new cement employs a bonding agent which is very efficient at high temperatures.

Among the destructive furnace actions to which this new cement is resistant are basic and acid slags, molten metal penetration, abrasion, erosion and chemical reaction in the burning of acid sludge. In addition, the material, when applied as a surface coating on boiler settings, protects the brickwork from the penetrating action of clinker and fusible coal ash.

In the field of chrome cements, Adachrome Plastic Super-Cement is reported to be the only cement sold in plastic form, ready for use without laborious mixing prior to use. The material is suited for making either lipped or troweled joints.

Another feature of the new cement is its exceptional plasticity, which contributes to ease of handling and working. The material is recommended by its manufacturer for lay-

Distribution of Cement

The following figures show shipments from portland cement mills distributed among the States to which cement was shipped during October and November, 1928 and 1929.

Portland cement shipped from mills into States in October and November, 1928 and 1929, in barrels[a]

Shipped to—	October		November	
	1928	1929	1928	1929
Alabama	226,835	172,980	192,012	132,035
Alaska	132	662	264	396
Arizona	60,063	52,544	56,742	43,145
Arkansas	126,798	190,656	99,304	133,371
California	1,145,337	1,075,308	1,025,113	943,641
Colorado	114,600	97,352	52,084	32,910
Connecticut	259,374	229,221	161,388	178,005
Delaware	73,582	36,005	25,357	28,275
District of Columbia	133,450	104,051	88,507	99,047
Florida	142,911	106,271	117,845	111,127
Georgia	180,537	124,215	146,394	121,871
Hawaii	34,436	22,716	22,593	26,788
Idaho	28,253	28,709	17,765	17,468
Illinois	2,127,381	1,406,895	930,003	782,779
Indiana	658,331	686,986	258,523	326,534
Iowa	442,740	716,047	96,294	127,446
Kansas	316,943	336,060	167,928	159,803
Kentucky	203,725	178,287	146,416	107,310
Louisiana	106,819	245,643	104,808	152,054
Maine	72,694	80,564	30,175	52,865
Maryland	307,849	291,625	157,297	233,983
Massachusetts	337,880	365,195	224,846	225,482
Michigan	1,449,956	1,161,054	728,972	588,511
Minnesota	306,698	352,958	124,063	130,411
Mississippi	133,253	99,934	124,113	71,069
Missouri	583,508	681,598	364,782	396,019
Montana	52,977	55,468	25,857	16,035
Nebraska	174,041	213,158	67,962	61,548
Nevada	9,954	15,028	9,566	8,173
New Hampshire	73,003	67,001	37,083	37,526
New Jersey	1,064,536	911,203	690,435	678,291
New Mexico	37,837	28,479	21,301	15,557
New York	2,445,879	2,295,014	1,565,942	1,441,207
North Carolina	238,528	147,399	248,290	110,928
North Dakota	41,390	42,474	14,375	9,564
Ohio	1,312,086	1,218,439	707,863	638,120
Oklahoma	314,273	376,193	238,178	261,283
Oregon	120,863	114,228	65,960	78,363
Pennsylvania	1,651,472	1,550,799	958,080	1,022,410
Porto Rico	0	5,195	500	3,520
Rhode Island	87,953	78,405	61,403	58,690
South Carolina	154,004	88,492	135,037	70,756
South Dakota	52,621	94,859	17,271	22,438
Tennessee	344,413	358,340	257,552	228,476
Texas	564,578	759,309	447,090	475,332
Utah	51,793	60,619	29,404	37,616
Vermont	107,388	109,422	31,272	43,012
Virginia	220,617	152,804	148,508	120,589
Washington	261,412	240,543	243,351	158,675
West Virginia	170,134	168,957	94,931	103,156
Wisconsin	622,618	597,697	258,637	224,480
Wyoming	17,682	28,708	11,987	9,346
Unspecified	11,413	0	32,678	0
	19,777,550	18,621,769	11,884,101	11,157,436
Foreign Countries	58,450	73,231	66,899	64,564
Total shipped from cement plants	19,836,000	18,695,000	11,951,000	11,222,000

(a) Includes estimated distribution of shipments from three plants each month.

Production and stocks of clinker (unground cement), by districts, in December, 1928 and 1929. (In thousands of barrels)

District	Production		Stocks at End of Month	
	1928	1929	1928	1929
Eastern Pennsylvania, New Jersey and Maryland	2,893	2,527	911	1,017
New York and Maine	976	895	898	714
Ohio, Western Pennsylvania and West Virginia	1,352	1,295	896	898
Michigan	1,242	1,129	659	629
Wisconsin, Illinois, Indiana and Kentucky	1,815	1,659	429	652
Virginia, Tennessee, Alabama, Georgia, Florida and Louisiana	1.150	986	789	684
Eastern Missouri, Iowa, Minnesota and South Dakota	1,352	1,076	475	529
Western Missouri, Nebraska, Kansas, Oklahoma and Arkansas (b)	747	967	396	182
Texas	483	686	148	474
Colorado, Montana, Utah, Wyoming(b) and Idaho(b)	229	56	345	243
California	960	1,070	1,198	1,105
Oregon and Washington	227	193	278	477
	13,426	12,539	7,422	7,604

Exports and imports of hydraulic cement, by months, in 1928 and 1929

Month	Exports				Imports			
	1928		1929		1928		1929	
	Barrels	Value	Barrels	Value	Barrels	Value	Barrels	Value
January	56,400	$ 204,875	78,639	$ 283,002	236,771	$ 315,797	151,302	$ 177,976
February	62,828	221,620	58,886	225,590	164,408	217,525	118,930	123,123
March	74,983	265,719	69,079	235,164	235,930	330,074	131,909	112,788
April	61,676	205,882	64,145	218,316	249,458	324,371	89,668	114,281
May	70,173	236,005	57,955	219,366	190,509	256,872	200,646	267,854
June	59,536	201,313	96,055	287,612	266,537	359,637	203,545	228,170
July	83,759	291,055	71,992	247,177	112,887	151,877	182,098	199,960
August	88,736	302,866	60,013	225,762	259,975	358,471	183,938	199,403
September	71,995	252,843	86,268	308,631	173,439	226,295	112,372	152,239
October	62,137	246,010	101,359	337,839	152,210	226,909	172,566	187,504
November	69,313	260,310	53,378	198,197	65,969	89,732	96,568	95,844
December	63,120	250,204	.....	.....	175,992	233,300	.....	.....
	824,656	2,938,702	.....	.....	2,284,085	3,090,860	.....	.....

ing up fire clay brick, silica brick, chrome brick, high alumina brick and also for laying up magnesite brick under certain conditions. It is also adaptable for use as a surface coating material, and as a binder in the mixture of patching materials for repairing burned-out sections of refractory construction.

Production and stocks of clinker, by months, in 1928 and 1929.
(In thousands of barrels)

Month	Production		Stock at End of Month		Month	Production		Stock at End of Month	
	1928	1929	1928	1929		1928	1929	1928	1929
January	11,839	(a)12,012	9,672	9,642	July	15,981	(a)15,214	11,707	11,619
February	11,363	11,255	12,237	12,436	August	16,202	(a)15,829	9,357	(a) 8,995
March	12,501	12,450	14,463	14,948	September	15,909	(a)15,165	7,566	(a) 7,009
April	13,844	14,166	15,002	(a)15,479	October	15,782	(a)15,515	5,944	(a) 5,934
May	16,025	(a)15,444	14,329	14,911	November	14,930	(a)14,087	5,953	(a) 6,134
June	15,940	15,312	12,944	(a)13,587	December	13,426	12,539	7,422	7,604

(a) Revised.
(b) The inclusion of Wyoming begins wtih April, 1929; of Idaho with June, 1929; of Arkansas with September, 1929.

Summary of Monthly Estimates of Clinker (Unground Portland Cement) Produced and in Stock At Mills in the United States in 1929, By Districts

(In thousands of barrels)

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Yea
Production													
Eastern Pa., N. J. and Md	2,824	2,899	2,958	3,100	3,463	3,397	3,314	3,544	3,250	3,202	2,821	2,527	37,299
New York and Maine	585	479	778	953	1,089	1,045	1,108	1,114	1,023	1,045	935	895	11,049
Ohio, Western Pa., and W. Va	1,121	1,102	1,213	1,394	1,591	1,683	1,772	1,742	1,624	1,578	1,577	1,295	17,692
Michigan	913	733	740	1,122	1,229	1,242	1,287	1,339	1,239	1,350	1,255	1,129	13,578
Wis., Ill., Ind. and Ky	1,617	1,630	1,793	1,890	1,946	2,023	1,851	1,788	1,731	1,779	1,840	1,659	21,547
Va., Tenn., Ala., Ga., Fla. and La	1,076	1,177	1,146	1,045	1,143	1,195	1,118	1,240	1,157	1,205	1,066	986	13,554
Eastern Mo., Ia., Minn., and S. Dak	1,276	923	926	1,234	1,491	1,457	1,411	1,384	1,551	1,657	1,260	1,076	15,646
Western Mo., Neb., Kans., Okla., and Ark.(a)	715	648	724	929	1,094	1,036	1,072	1,216	1,276	1,281	1,147	967	12,105
Texas	456	430	554	613	617	587	652	770	712	793	731	686	7,601
Colo., Mont., Utah, Wyo.(a) and Idaho(a)	101	84	188	343	323	319	252	263	263	283	116	56	2,591
California	1,053	930	1,079	1,119	1,067	1,052	1,122	1,121	1,020	1,059	1,088	1,070	12,780
Oregon and Washington	275	220	351	424	391	276	255	308	319	283	251	193	3,546
	12,012	11,255	12,450	14,166	15,444	15,312	15,214	15,829	15,165	15,515	14,087	12,539	168,988
Stocks (end of month)													
Eastern Pa., N. J. and Md	1,344	2,063	2,526	2,648	2,616	2,361	2,003	1,653	1,297	962	891	1,017	.....
New York and Maine	1,080	1,153	1,347	1,413	1,382	1,249	1,014	704	507	441	540	714	.....
Ohio, Western Pa., and W. Va	1,189	1,469	1,781	1,790	1,804	1,636	1,293	878	607	478	537	898	.....
Michigan	876	1,089	1,354	1,521	1,376	1,167	1,034	804	538	465	502	629	.....
Wis., Ill., Ind., and Ky	1,002	1,769	2,477	2,470	2,356	2,084	1,591	967	512	367	442	652	.....
Va., Tenn., Ala., Ga., Fla., and La	995	1,292	1,418	1,358	1,232	1,152	1,021	816	686	603	593	684	.....
Eastern Mo., Ia., Minn., and S. Dak	566	817	1,102	1,199	1,157	1,024	869	667	562	499	430	529	.....
Western Mo., Neb., Kans., Okla., and Ark.(a)	530	696	796	774	751	705	624	414	250	208	184	182	.....
Texas	145	182	216	216	187	228	188	255	268	293	372	474	.....
Colo., Mont., Utah, Wyo.,(a) and Idaho(a)	395	405	536	573	533	528	459	365	314	274	270	243	.....
California	1,219	1,082	967	1,004	933	878	1,010	1,005	1,060	944	945	1,105	.....
Oregon and Washington	301	419	428	513	584	575	513	467	408	400	428	477	.....
	9,642	12,436	14,948	15,479	14,911	13,587	11,619	8,995	7,009	5,934	6,134	7,604	.....

(a) The inclusion of Wyoming begins with April, 1929; of Idaho with June, 1929; of Arkansas with September, 1929. January 20, 1930.

Summary of Monthly Estimates of Production and Shipments of Finished Portland Cement in 1929, By Districts

(In thousands of barrels)

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	1929	1928
Production														
Eastern Pa., N. J. and Md	2,410	2,199	2,513	3,005	3,541	3,697	3,709	3,941	3,600	3,571	2,973	2,479	37,638	39,677
New York and Maine	405	412	593	900	1,137	1,197	1,366	1,449	1,241	1,129	848	731	11,408	11,484
Ohio, Western Pa. and W. Va	818	829	908	1,401	1,595	1,885	2,139	2,180	1,919	1,731	1,537	940	17,882	18,326
Michigan	703	525	476	964	1,387	1,466	1,432	1,582	1,519	1,437	1,228	1,008	13,727	13,848
Wis., Ill., Ind. and Ky	1,047	862	1,086	1,903	2,065	2,305	2,354	2,425	2,182	1,935	1,760	1,445	21,369	22,749
Va., Tenn., Ala., Ga., Fla. and La	884	887	1,028	1,117	1,276	1,279	1,250	1,450	1,298	1,306	1,085	905	13,765	15,949
Eastern Mo., Ia., Minn. and S. Dak	1,198	678	644	1,150	1,548	1,607	1,570	1,578	1,670	1,718	1,344	993	15,698	16,693
West. Mo., Nebr., Kans., Okla. and Ark(a)	614	482	620	953	1,117	1,089	1,159	1,430	1,422	1,331	1,176	976	12,369	10,939
Texas	466	399	527	622	655	554	701	707	707	777	661	593	7,369	6,346
Colo., Mont., Utah, Wyo.(a) and Idaho(a)	50	74	57	307	363	325	322	357	314	323	120	84	2,696	2,772
California	1,034	1,071	1,170	1,085	1,142	1,110	991	1,128	967	1,179	1,091	913	12,881	13,556
Oregon and Washington	252	104	347	343	325	289	322	358	384	294	230	148	3,396	3,960
	9,881	8,522	9,969	13,750	16,151	16,803	17,315	18,585	17,223	16.731	14,053	11,215	170,198	176,299
Shipments														
Eastern Pa., N. J. and Md	1,387	1,354	2,506	3,164	3,967	4,201	4,171	4,584	3,924	4,043	2,949	1,323	37,573	39,739
New York and Maine	257	232	504	732	1,184	1,383	1,609	1,747	1,434	1,407	738	294	11,521	11,357
Ohio, Western Pa. and W. Va	430	442	869	1,274	1,660	2,046	2,282	2,464	2,386	2,176	1,197	511	17,737	18,037
Michigan	266	302	543	897	1,322	1,720	1,950	2,290	1,800	1,323	667	246	13,326	14,044
Wis., Ill., Ind. and Ky	313	373	948	1,608	2,356	2,706	2,837	3,275	2,759	2,346	1,219	429	21,169	22,627
Va., Tenn., Ala., Ga., Fla and La	824	662	960	1,251	1,301	1,285	1,543	1,644	1,311	1,419	1,025	821	14,046	15,770
Eastern Mo., Ia., Minn. and S. Dak	189	215	700	1,086	1,649	2,123	2,223	2,589	2,325	1,870	742	273	15,984	16,544
West. Mo., Nebr., Kans., Okla. and Ark.(a)	349	311	905	1,034	1,007	1,126	1,382	1,773	1,542	1,508	788	529	12,254	11,222
Texas	458	416	594	625	563	579	666	786	681	743	523	450	7,084	6,231
Colo., Mont., Utah, Wyo.(a) and Idaho(a)	61	57	144	266	334	336	299	368	358	346	119	81	2,769	2,628
California	1,033	984	1,148	1,058	1,066	1,113	995	1,123	1,023	1,183	1,038	813	12,577	13,700
Oregon and Washington	140	100	292	330	297	331	362	409	407	331	217	138	3,354	3,939
	5,707	5,448	10,113	13,325	16,706	18,949	20,319	23,052	19,950	18,695	11,222	5,908	169,394	175,838

(a) The inclusion of Wyoming begins with April, 1929; of Idaho with June, 1929; of Arkansas with September, 1929.

Summary of Estimates of Stocks of Finished Portland Cement at End of Each Month in 1929, By Districts

(In thousands of barrels)

District	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Eastern Pa., N. J. and Md	6,087	6,933	6,941	6,781	6,355	5,852	5,389	4,777	4,452	4,000	4,020	5,176
New York and Maine	1,804	1,984	2,073	2,242	2,195	2,009	1,765	1,467	1,274	996	1,107	1,544
Ohio, Western Pa. and W. Va	3,224	3,611	3,650	3,777	3,711	3,578	3,435	3,152	2,685	2,240	2,580	3,010
Michigan	2,435	2,658	2,591	2,659	2,724	2,469	1,979	1,238	961	1,075	1,636	2,398
Wis., Ill., Ind. and Ky	3,423	3,911	4,049	4,343	4,052	3,650	3,168	2,318	1,740	1,329	1,869	2,885
Va., Tenn., Ala., Ga., Fla. and La	1,955	2,180	2,248	2,114	2,117	2,111	1,818	1,623	1,610	1,498	1,557	1,641
Eastern Mo., Ia. Minn. and S. Dak	3,891	4,353	4,297	4,362	4,261	3,745	3,092	2,081	1,426	1,273	1,876	2,595
Western Mo., Nebr., Kans., Okla. and Ark.(a)	1,610	1,782	1,497	1,416	1,527	1,492	1,269	926	798	621	1,009	1,456
Texas	530	513	446	443	535	510	546	466	492	527	670	813
Colo., Mont., Utah, Wyo.(a) and Idaho(a)	524	541	451	492	521	506	529	518	475	451	453	456
California	785	871	894	921	997	995	991	997	941	937	991	1,090
Oregon and Washington	529	533	587	601	629	588	544	493	471	434	445	455
	26,797	29,870	29,724	30,151	29,624	27,505	24,525	20,056	17,325	15,381	18,213	23,519

(a) The inclusion of Wyoming begins with April, 1929; of Idaho with June, 1929; of Arkansas with September, 1929.

COMING EVENTS

Feb. 4-6, 1930. New York, N. Y. Annual meeting Sand-Lime Brick Association, at Pennsylvania Hotel. Ellen Knight, secretary, Saginaw, Mich.

Feb. 4, 1930. Dallas, Tex. Portland Cement Association regional safety meeting, at Baker Hotel. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Feb. 11-13, 1930. New Orleans, La. Annual meeting, American Concrete Institute, at the Roosevelt Hotel.

Feb. 11, 1930. Cincinnati, O. Portland Cement Association regional safety meeting, at Hotel Gibson. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Feb. 12-14, 1930. Ottawa, Can. Engineering Institute of Canada, annual convention.

Feb. 25-28, 1930. Wichita, Kan. Fifth annual Southwest Road Show and School at the Coliseum. Secretary, P. O. Box 1043, Wichita, Kan.

Feb. 25, 1930. St. Louis, Mo. Portland Cement Association regional safety meeting at Hotel Coronado, A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Mar. 3-5, 1930. Chicago. National Management Congress, at Stevens Hotel. G. E. Pfisterer, manager, 308 W. Washington St., Chicago.

Mar. 3-7, 1930. Chicago. Industrial Equipment Exposition at Stevens Hotel. G. E. Pfisterer, manager, 308 W. Washington St., Chicago.

Mar. 3-7, 1930. Chicago. National Industrial Exposition at the Stevens Hotel. George Pfisterer, secretary, 308 W. Randolph St., Chicago.

March 4, 1930. La Salle, Ill. Portland Cement Association regional safety meeting, at Hotel Kaskaskia. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Mar. 5-7, 1930. Chicago. National Industrial Equipment Exposition sponsored by the Society of Industrial Engineers, the American Society of Mechanical Engineers, the American Management Association, the National Association of Cost Accountants, and the National Association of Foremen, at the Stevens Hotel. G. E. Pfisterer, manager, 308 W. Washington St., Chicago.

Mar. 5-7, 1930. Chicago. Third National Materials Handling Meeting, American Society of Mechanical Engineers, at the Stevens Hotel.

March 18, 1930. Des Moines, Ia. Portland Cement Association regional safety meeting, at Hotel Fort Des Moines. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

March 19, 1930. Detroit. Regional meeting, American Society for Testing Materials, at Book-Cadillac Hotel. F. O. Clements, chairman, care General Motors Co., Detroit.

March 25, 1930. Kansas City, Mo. Portland Cement Association regional safety meeting, at Hotel Muehlebach. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Apr. 5-9, 1930. New York, N. Y.; Hoboken, N. J.; Washington, D. C. Fiftieth anniversary meeting, American Society of Mechanical Engineers, at American Machinist offices in New York; Stevens Institute, Hoboken; U. S. Chamber of Commerce Bldg., Washington.

April 7-11, 1930. Atlanta, Ga. Annual meeting, American Chemical Society.

April 15, 1930. Albany, N. Y. Portland Cement Association regional safety meeting, at Hotel Ten Eyck.

May 12, 1930. Cleveland, O. Meeting, Steel Founders' Society of America. G. P. Rogers, managing director, 932 Graybar Bldg., New York, N. Y.

May 29, 1930. Easton, Pa. Portland Cement Association regional safety meeting, at Hotel Easton. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

June 16-25, 1930. Berlin, Germany. World Power Conference. World Power Conference Program Committee, Room 818, 29 W. 39th St., New York, N. Y.

June 24, 1930. Cleveland, O. Portland Cement Association regional safety meeting, at Hotel Cleveland. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

June 26, 1930. Washington, D. C. Portland Cement Association regional safety meeting, at Hotel Raleigh. A. J. R. Curtis, secretary, 33 W. Grand Ave., Chicago, Ill.

Propulsive Strength Of Explosives

The factors that contribute to the effectiveness of dynamite in blasting rock are being investigated at the Explosives Experiment Station of the United States Bureau of Mines, near Pittsburgh, Pa. These factors are generally conceded to be (1) the propulsive strength or heaving effect, a figure proportional to the total work which a unit weight of the explosive is capable of accomplishing; (2) the speed or rate of detonation; and (3) the density of the explosive. There are many types of blasting explosives on the market and these vary considerably in propulsive strength, speed, and density in order that there may be types suitable for the different classes of rock met with in blasting operations. For example: Soft ground may require an explosive of the type of black blasting powder which gives up its energy relatively slowly and produces a slow "heave" which moves this kind of ground effectively; on the other hand, hard rock requires an explosive of high density and high speed such as the gelatin dynamites.

Various means of measuring the propulsive strength have been proposed and none seems entirely satisfactory. At the Explosives Experiment Station a device known as the ballistic pendulum is employed and samples of all the commercial blasting explosives are being tesed with it. It is planned later to attempt to measure the pressure produced by the various explosives when fired in a bore-hole confined in their own volume, and from these figures to calculate the total work which the gases are capable of doing when allowed to expand under different conditions. The speed or rate of detonation is measured by a photographic method which automatically draws a time-distance curve of the path of the detonation wave and enables the speed of detonation to be calculated at any part of the column of detonating explosive.

Photographing Vortex Rings Produced By Detonating Dynamite

Invisible vortices produced by detonating explosives are being photographed at the Pittsburgh experiment Station, United States Bureau of Mines, in connection with an investigation of the sensitivity of dynamites to detonation. These vortices, which are similar in shape to the rings produced by adept smokers of tobacco, are produced when the shock wave from the explosive emerges from the mouth of a borehole, gun muzzle, or steel tube in which the dynamite is detonated. The pressure in the vortex is lower than atmospheric due to the effect of centrifugal force on the rapidly revolving gases, and this reduced pressure is clearly shown on the photograph as a dark line in contrast to the bright line produced by pressure waves. The work is part of an investigation to determine the mechanism by which detonation is transmitted from one cartridge of dynamite to another when the charges are separated by an air-gap.

RECENT PATENTS

PIT AND QUARRY will furnish, at its actual cost, a copy of any patent cited below. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.

American Patents

Buckets

Conveyer-bucket and means for closing it. Azzel C. Bennett, Hudson, N. Y., assignor to Gifford-Wood Co., same place. No. 1,741,123.

Bucket-tooth mounting. Edward L. Harrington, Erie, Pa., assignor to G. H. Williams Co., same place. No. 1,743,890.

Concrete

Apparatus for making concrete. Karl Piehler, Leipzig-Gohlis, Germany. No. 1,742,002.

Concrete-placing apparatus. Edward G. Carr, Chicago, Ill., assignor to Lakewood Engineering Co., Lakewood, Ohio. No. 1,743,114.

Crushing Equipment

Frame for crushing machinery. George W. Borton, New Lisbon, N. J., assignor to Pennsylvania Crusher Co., New York, N. Y. No. 1,743,911.

Crusher. William A. Battey, Haverford, and Charles J. Jamison, Philadelphia, Pa., assignors to Pennsylvania Crusher Co., New York, N. Y. No. 1,743,996.

Material Handling

Apparatus for handling loose material. Thomas E. Pray, Chicago, Ill., assignor to Goodman Mfg. Co., same place. No. 1,742,009.

Apparatus for handling loose material. Charles E. Davis, Chicago, Ill., assignor to Goodman Mfg. Co., same place. No. 1,742,026.

Excavator and method of operating same. Frank Elwood, Weiner, Ark. No. 1,743,123.

Method of forming piles. Donald McG. Newton, Montclair, N. J., assignor to MacArthur Concrete Pile Corporation, New York, N. Y. No. 1,742,926.

Piling for subaqueous construction. Victor G. Brash, Tampa, Fla. No. 1,742,947.

Self filling and dumping truck. Walter J. Zajkowski, Linoleumville, N. Y. No. 1,742,798.

Mixers

Mixer for road materials. Frederick H. Cummer, Los Angeles, Cal. No. 1,741,013.

Machine for mixing road material. John W. Osborne, Alsey, Ill. No. 1,741,035.

Snubber for concrete-mixer skips. Adolph W. Rybeck, Milwaukee, Wis., assignor to T. L. Smith Co., same place. No. 1,740,786.

Vibrating skip for concrete-mixers. Samuel Shafer, Jr., Milwaukee, Wis., assignor to Chain Belt Co., same place. No. 1,742,420.

Miscellaneous

Expansion joint for concrete roads. Albert C. Fisher, Chicago, Ill., assignor to Philip Carey Mfg. Co., No. 1,742,651.

Locking device for skidding carriages. Joseph H. Dickenson, Winter Park, Fla., assignor to Lidgerwood Mfg. Co., New York, N. Y. No. 1,742,498.

Penetration method of road construction. Edwin C. Wallace, Newton, Mass. No. 1,740,718.

Foreign Patents

Blasting Caps

Safety blasting cap. Canadian Industries Ltd. Canadian 295,753.

Cement Manufacture

Process for production of white cement. Societa "Cementi del Friuli." German S 79,905.

Increasing strength properties of cements through addition of blast-furnace dust. Buderussche Eisenwerke. German B 134,369.

Production of cement with admixture of gypsum. Carl Pontoppidan and Svend Buntzen. German P 54,315.

Concrete Mixers

Bearing for concrete mixers, etc. Fritz Kirch. German DRGM 1,098,671.

Apparatus for measuring cement for concrete mixers. Carl Krahn and Johannes Kohlhoff. German K 106, 351.

Concrete mixer. Gebhard Jaeger. German J 27,902.

Coolers

Rotary cooler. Societe d'Exploitation des Procèdes Industriels Candlot. German 483,687.

Crushers

Stone crusher with a fixed and a swinging jaw, in which the swinging jaw is driven simultaneously by two eccentrics. Julius Baniay. German B 138,585.

Improvement in Cone Crushers. Nordberg Mfg. Co. German N 30,856.

Hammer crusher. Arno Andreas. German A 50,003.

Drills

Rock drill. Ingersoll-Rand Co. Canadian 295,987.

Extension drill. John Grant. German G 68,402.

Burning

Method and apparatus for burning powdered fuel. Foster-Wheeler Corp. Canadian 295,772.

Whirlwind burner for pulverized coal firing. Deutsche Babcock & Willcox. Dampfkessel-Werke A. G. German D 56,432.

Firing regulator. Siemens & Halske A. G. German S 80,130.

Kilns and Accessories

Shaft kiln, particularly for production of fused cement. Conradi. German C 42,359.

Mechanically driven roller grate for shaft kilns. Federico Graf. German G 75,012.

Continuous drawing process for shaft kiln. Isai Isserlis. German J 30,125.

Mills and Grinding

Four-roller mill. Alfred Erasmus Geoffrey MacCallum. German M 108-297.

Process for grinding of cement and similar materials with introduction of a cooling medium. Carl Pontoppidan. German P 58,644.

Spring-roller mill. Ernst Curt Loesche. German 479,643.

Tube mill. Maschinenbau-Anstalt Humbolt. German DRGM. 1,096,984.

Hammer mill. Eksploatacja Wynalazkow Spolka z Ograniczona Odpowiedzial Noscia. German 482,597.

Stone or Coal pulverizer. Heinrich Lohmann. German 482,897.

Combination mill. G. Polysius A. G. German 482,694.

Pressures Produced By Dynamites

The explosion of a charge of dynamite is usually associated in our minds with a deafening concussion, but this is true only of dynamite fired in the open air. Charges of dynamite are exploded in massive steel bombs at the Pittsburgh Experiment Station of the United States Bureau of Mines, with only a metallic "click" to indicate that the charge has exploded and that pressures of 10,000 to 20,000 lbs. per sq. inch have been produced inside the bomb. These bombs, known as Bichel gauges, are used to measure the actual pressures produced by detonating explosives when fired in a borehole. The magnitude of the pressure is a measure of the ability of the explosive to do work. Pressures are being measured as part of the Bureau's program to investigate the factors influencing the effectiveness of explosives in actual blasting.

PERSONAL MENTION

Johns Francis Coleman, consulting engineer of New Orleans, La., was elected president of the American Society of Civil Engineers at the business session of the Society recently held in New York, N. Y.

E. B. Bushnell, formerly with the Portland Cement Association, has recently associated with the Masonite Corporation of Chicago.

Stuart M. Crocker, who on January 1 resigned his position as vice-president and treasurer of the United Electric Securities Company to become assistant to the president of the International General Electric Company, has been elected a vice-president of the latter company, President Clark Minor has announced.

Mr. Crocker, a graduate of Harvard University, was assistant to Owen D. Young, chairman of the board of the General Electric Company and Radio Corporation of America previous to his position with the securities company. In 1924 he accompanied Mr. Young to Europe as secretary of the American delegation to the Experts conference which culminated in the Dawes plan. In 1928 he also accompanied Mr. Young abroad in connection with the Paris reparations conference which formulated the Young plan. Mr. Crocker's office will be at 120 Broadway, New York.

George H. Palm, for the past six years engineer with the new development division of the Yellow Coach and Manufacturing Company, Pontiac, Michigan, a division of General Motors, has become connected as engineer in charge of radiator construction and equipment, with the Young Radiator Company, manufacturers of truck, bus, power unit and engine cooling radiators, as well as heating units.

Col. Robert Isham Randolph, of the engineering firm of Randolph-Perkins Co., Chicago, has been elected president of the Chicago Association of Commerce. Col. Randolph is well known in engineering circles and has been active in Chicago civic affairs for many years.

Inscoe R. Bailey, formerly with the Dayton Whirley Company, is aiding in the design and field adaptation of the American Revolver, a new machine recently put on the market by the American Hoist and Derrick Company.

Wilfred R. Wood and the Irving Trust Company, receivers of Combustion Engineering Corporation, New York, have announced the appointment of **Joseph V. Santry**, as head of that organization to succeed **Col. H. D. Savage**, who is assisting the receivers.

Mr. Santry, who became identified with Combustion Engineering Corporation shortly after its organization in 1914, served successfully as director and vice-president in charge of sales for five years and as president for four years, resigning about two years ago.

Mortimer Elwyn Cooley, dean emeritus of the college of engineering, University of Michigan, has been chosen by the Washington Award Commission (made up of representatives of the Western Society of Engineers and the four founder societies) to receive the award for 1930. The presentation will be Feb. 24 in Chicago. The award is given for "accomplishments which pre-eminently promote the happiness, comfort and well-being of humanity." Previous recipients are as follows: **Herbert C. Hoover, Robert N. Hunt, Prof. Arthur N. Talbot, J. Waldo Smith, John W. Alvord, Orville Wright** and **Michael I. Pupin.**

W. R. Holway, consulting engineer, of New York City, has opened a branch office in Tusa, Okla., where he has been retained to make a report on the future water supply of Tulsa and to design and construct such work as is necessary during the next four or five years. Mr. Holway has recently returned from Russia, where he went to make a report on the new water supply of Moscow.

Henry R. Lordly has been awarded the Perry F. Nursey memorial premium for 1929 by the Council of the Society of Engineers, London, England, for a paper on the waterproofing of concrete structures. This premium is awarded annually to the author of a meritorius technical paper adding to engineering knowledge. Mr. Lordly was formerly engineer of design and construction on the Lachine Canal for the Canadian Department of Railways and Canals, and is now attached to the technical service of the city of Montreal. In 1920 he was McGraw fellow in engineering at Cornell University.

Joseph J. Jessup, for the past seven years consulting engineer with offices in Los Angeles and San Francisco in association with **C. C. Kennedy**, has been appointed city engineer of Los Angeles, effective Jan. 16. Mr. Jessup succeeds **John C. Shaw.**

Percy L. Reed, professor of civil engineering, University of Florida, was appointed on Jan. 13 acting dean of the college of engineering to succeed the late **Dr. Benton.** Professor Reed, a graduate of Lehigh, has been with the University of Florida since 1920.

Norman M. Stineman, a civil engineer of wide experience, has accepted the editorship of *Concrete*. He graduated in 1911 from Ohio Northern University, after which he spent six years in the engineering department of the Chicago, Milwaukee and St. Paul Railway. He resigned from professional work to serve in the Engineering Reserve Corps during the World War, spending five months first on our Mexican border and then fourteen months in France with the 33d Engineers.

He has conducted investigations such as the structural effects of the Santa Barbara earthquake, and hurricans and tornadoes in several regions. More recently he has served as a member of the New York Building Code sub-committee. He has membership in the American Society of Civil Engineers. Western Society of Engineers, American Military Engineers, and the board of trustees of his alma mater.

Harry L. Monroe, commercial vice-president of the General Elctric Company with headquarters at Chicago, died at Dallas, Tex., on January 7 following a long illness. Mr. Monroe completed 40 years of service with the company in September, 1928, six months after his election to the vice-presidency. Mr. Monroe was born in Parkersburg, W. Va., in 1869. He entered the employe of the company in 1888, with the Thomson-Houston Company in Chicago. In 1890 he was transferred to the railway department, and in 1894 became a salesman operating out of the Dallas Office of the General Electric Company. He was made manager of the railway department of the central district in 1905, and eight years later was named district sales manager, and later district manager of the central district, with offices in Chicago.

FINANCIAL NEWS
CORPORATE & BUSINESS

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

Indiana Limestone's Annual Report

The Indiana Limestone Company and subsidiary reports a consolidated net income for the fiscal year ended November 30, 1929, of $10,349, after depreciation, depletion, interest and federal taxes. This is equivalent to 20 cents a share on 50,000 shares of 7 per cent preferred stock, as against $430,145 or 5 cents a share on 1,500,000 shares of common stock after allowing for preferred dividends in the preceding year.

In a letter to stockholders A. E. Dickinson, president of the company, after calling attention to the reduction of $412,000 in funded debt during the year, said that in view of conditions in the building industry during the last eighteen months, the volume of business done by the company in 1929 is considered satisfactory. Unfilled orders are stated to be the highest in the history of the company.

With the release of capital from the stock market operations, the encouragement of building construction by federal, state and municipal governments and with the return of more normal conditions to the building industry, the business of the current fiscal year is expected to be much more satisfactory, according to Mr. Dickinson.

The consolidated balance sheet as of November 30, last, shows current assets of $6,823,487 and current liabilities $1,561,531 as compared with $7,386,863 and $1,743,943 respectively on November 30, 1928. The profit and loss surplus at the end of the fiscal year amounted to $644,157 against $928,228 at the end of the previous twelve months' period.

Consolidated income account for the year ended November 30, 1929, compares as follows:

	1929	1928	1927
Net sales	$10,917,268	$11,985,200	.....
Cost and expenses	9,175,833	9,616,263	.....
Operating profit	$ 1,741,435	$2,368,937	.....
Other income	63,437	51,946	.....
Total income	$ 1,804,872	$2,420,883	$2,697,526
Depreciation and depl.	613,274	719,579	944,692
Interest	1,178,249	1,211,160	1,218,005
Federal taxes	3,000	60,000	37,000
Net profit	$ 10,349	$ 430,144	$ 497,829
Preferred dividends	350,000	350,000	350,000
Deficit	$ 339,651	$ 80,144*	$ 147,829*

*Surplus.

Tremendous Gain by Indiana Limestone

Following closely upon the net earnings statement of $10,349 net earnings for the entire fiscal year ended November 30, 1929, comes the almost unbelievable net profit report of $42,000 for the month of December, the first month of the new fiscal year, as announced by Lawrence Whiting, chairman of the board.

"As further striking evidence of a real improvement in national building activities," stated Mr. Whiting, "our unfilled orders are the highest in the company's history. Shipments this month are far ahead of the same period in 1929. In a year more than $800,000 has been charged off in obsolete plants and equipment; nevertheless, our production capacity has been enlarged, through increased operating efficiency, which includes shutting downstream plants that formerly produced electricity for quarry operations. Current is being obtained much more cheaply from the Interstate Public Service Company."

Cement Merger As Stabilizer

Acquisition of Atlas Portland Cement Co. by the Universal Portland Cement Co., subsidiary of the United States Steel Corporation, should prove a stabilizing influence in the industry on account of the size of the consolidation, although the two companies have widely separated plants, and competed in only a few minor districts.

Atlas Portland Cement has plants at Coplay, Pa., Northampton, Pa., Hannibal, Mo., Leeds, Ala., Hudson, N. Y. and Waco, Texas. In all these districts the Universal company was without production and the two plants therefore did not come into competition for business. Plants of the Universal are located at Buffington, Ind., Morgan Park, Minn., and Universal, Pa. The latter is near Pittsburgh, a territory rarely entered by Atlas in its competition for business.

As the Universal company has an annual capacity of 17,300,000 bbl. a year, and the Atlas company between 19,000,000 and 20,000,000 bbl., the merged concern will have a capacity of around 37,000,000 bbl., a good proportion of the total of the country, making it an important factor in the industry when efforts are being made for stability.

Action of United States Steel officials in obtaining the Atlas company was merely another step in the plans to keep the big concern in the strongest position. Other plans are under consideration in connection with the organization which will give it addi-

CURRENT DIVIDENDS

COMPANY	CLASS OF STOCK	DIVIDEND RATE	HOLDERS OF RECORD	PAYABLE
Alpha Portland Cement	Common	$.75 qr.	Dec. 30	Jan. 15
American Brick Co	Preferred	$.50 qr.	Jan. 25	Feb. 1
Bessemer Limestone & Cement	Class A	$.75 qr.	Jan. 20	Feb. 1
Calaveras Cement Co	7% Pfd.	1¾% qr.	Dec. 30	Jan. 15
Consolidated Sand & Gravel	Preferred	1¾% qr.	Jan. 31	Feb. 15
Illinois Brick	.....	$.60 qr.	Jan. 1	Jan. 15
Johns Manville	Common	$.75 qr.	Dec. 26	Jan. 16
Kentucky Cons. Stone Co	Preferred	1¾% qr.	Jan. 15	Feb. 1
Lehigh Portland Cement	Common	$.62½ qr.	Jan. 14	Feb. 1
Missouri Portland Cement	.....	$.50 qr.	Jan. 19	Feb. 1
Pacific Clay Products	.....	$.75 qr.	Jan. 20	Feb. 1
Pennsylvania Salt Co	Common	$1.25 qr.	Dec. 30	Jan. 15
Riverside Cement	1st Pfd.	$1.50 qr.	Jan. 15	Feb. 1
Riverside Cement	A Part.	$.31¼ qr.	Jan. 15	Feb. 1
Raymond Concrete Pile	Preferred	$.75 qr.	Jan. 20	Feb. 1
Raymond Concrete Pile	Common	$1.00 qr.	Jan. 20	Feb. 1
Southern Asbestos	Common	$1.25 S	Dec. 31	Jan. 15
Southern Asbestos	Common	$.25 ext.	Dec. 31	Jan. 15
Standard Paving & Materials, Ltd.	Preferred	1¾% qr.	Feb. 2	Feb. 15
Standard Paving & Materials, Ltd	Common	$.50 qr.	Feb. 2	Feb. 15
Superior Portland Cement	Class A	$.27½M	Jan. 23	Feb. 1
Warner Co	Common	$.50 qr.	Dec. 30	Jan. 15
Wolverine Portland Cement	.....	$.15 qr.	Feb. 5	Feb. 15
Worcester Salt Co	Preferred	1½% qr.	Feb. 10	Feb. 15

tional strength, particularly in its supply of raw materials which are so necessary for the economical operation of its steel plants.

It has just been definitely announced that the executive offices of the new company will be located in Chicago.

Through its acquisition of Atlas the Universal has opened new territory for its sales organization. Because of the location of its own plants the company could not do business in some of the best consuming districts of the country. Freight rates and other factors entered into the situation. With the combined concern it will be able to enter all the leading consuming sections of the East, Middle West, and South.

Scofield-Pioneer Merger

In December the entire interests of the George Scofield Company of Tacoma, Wash., operating a large wholesale and retail sand and gravel plant, and conducting a general building materials business in a modern plant on Dock Street, were taken over by the Pioneer Sand and Gravel Company, as George Scofield, president, plans to retire from active business at once. The Scofield Company operated one of the largest and oldest plants in Tacoma, with tidewater, rail and road shipping facilities, and maintained a large building materials warehouse on Lake Union in Seattle. They were also Tacoma agents for a line of building materials handled exclusively by the Pioneer Company for the past 20 years.

Approximately $400,000 was given as the purchase price, according to Mr. Ostrander, president of the Pioneer Company, and another $100,000 is now being expended on a new warehouse, part of which will be two stories high, nearing completion on a valuable tract of land 310 by 500 feet in size, fronting Lake Union in Seattle. A large ready-mix concrete plant is being added to the Scofield plant in Tacoma as well as increasing bunkering capacity to about 4,000 cubic yards, making it one of the largest plants of its kind on the Pacific Coast. Under the new plan, the present Scofield warehouse on the West Side of Lake Union, Seattle, will be abandoned, and likewise the present Pioneer retail yard at the foot of Westlake Avenue, also on Lake Union, both yards to be consolidated in the new quarters a few blocks further east along the lake which is under construction. Another large retail plant at Seattle Harbor, and one on Lake Washington, all accessible by barges, give this company one of the finest retailing plants of its kind in the West. Lakes Union and Washington encircle Seattle and are connected to tidewater by famous Lake Washington Ship Canal.

Refractories Firms Merge

General Refractories Company, Philadelphia, Pennsylvania, announces that it has acquired all of the refractories properties of Evens and Howard Fire Brick Company of St. Louis, Missouri. The Evens and Howard Fire Brick Company has been a prominent manufacturer of high grade fire brick since 1857 with plants located in St. Louis, Missouri, and Stevens Pottery, Georgia, having total combined daily capacity of 180,000 brick per day. The purchase includes not only the refractories plants and business of Evens and Howard Fire Brick Company, but also its vast and important clay lands in Missouri and Georgia.

This now gives General Refractories Company a total of 18 large modern plants distributed in Pennsylvania, Maryland, Kentucky, Illinois, Missouri and Georgia, with a total capacity of almost 1,200,000 brick per day, and so places it in excellent strategic position to serve all needs of refractory consumers throughout the country.

The Evens and Howard Fire Brick Company refractory plants will be operated by General Refractories Company as the Evens and Howard Division, and the well known brands of the old company will be continued. The sewer pipe operations will be continued in operation by the Evens and Howard Company as formerly.

NEW CORPORATIONS

Bangor Central Slate Co., Bangor, Pa. New corp. $60,000.

Sand Products Corp., Max B. McKee, Pres., 2489 First National Bank Bldg., Detroit, Mich. New corp. $1,500,000. 15,000 shares n.p.v. Mark T. McKee, V. P., Detroit, Mich.; A. R. Merrick, V. P., Saginaw, Mich.; C. F. Nigent, Sec., Muskegon, Mich.; A. N. Farmer, Treas., Cleveland, Ohio. Merger of West Michigan Sand & Fuel Co., Muskegon, Mich.; Manistee Sand & Dock Co., Manistee, Mich., and Port Crescent Sand & Fuel Co., Port Crescent Sand & Fuel Co., Port Crescent, Mich. Produce core and glass sand and will later produce moulding sand and other sand products.

Nueces River Sand & Gravel Co., Corpus Christi, Tex. New corp. $5,000. L. W. Cage, J. R. Garrett, William M. McKennon.

C. E. Robinson Sand Co., C. E. Robinson, Coeburn, Va. New corp. $3,000. To mine building and engine sand near Seco, Ky. Randall A. Leach, Cynthia Adkins. (Previously reported as C. R. Roberson Sand Co.)

Washington Portland Cement Co., R. A. Young, 2605—44th St., Seattle, Wash. New corp. $50,000. To manufacture portland cement and lime products. Paul F. McKenna, Ralph L. Brandt.

Calacium Carbonate Corp., c/o L. H. Herman, Wilmington, Del. New corp. 50,000 shares n.p.v. Limestone and limestone products. H. E. Grantland, H. H. Snow, Wilmington, Del.

Kentucky Limestone Co., John W. Diebold, Russellville, Ky. New corp. $50,000. Anton Diebold, Sr.; J. C. Diebold.

Blue Bell Lime Co., South Temple, Pa. New corp. $10,000. To produce crushed stone and manufacture lime and lime products. Norman B. Ringler, Treas., Philadelphia, Pa. Frank A. Kremser, 2513 N. Howard St., Fleetwood, Pa. Louis Greenblatt, Atty., 605 Finance Bldg., Philadelphia, Pa.

American Stone Corp., 150 Rutledge Ave., East Orange N. J. New corp. Crushed stone. Emile Bonnett, Raymond Cookston, Harold Bradley, all of 70 Fifth Ave., New York, N. Y.

T. E. Stephenson Sand & Gravel Co., Jackson, Miss. New corp. $30,000.

Gatesville Gravel Co., Gatesville, Miss. New corp. $15,000. 150 shares, $100 per share. C. E. Fairley, Hattiesburg, Miss.; George H. Smith, Crystal Springs, Miss.

Wilburg Sand Co., Lawrence B. Wilburg, Crisman, Ind. New corp. 60 shares, $100 per share. James R. Blair, S. Sigler.

Producers Sand & Gravel Co., Ltd., Victoria, B. C., Can. New corp. $250,000.

Edgerton Sand & Gravel Co., Edgerton, Wis. New corp. $50,000. Frank M. Lipke, Richard Miller, Wm. Bussey.

Eliot Sand & Gravel Co., c/o E. P. Foster, 141 Broadway, New York, N. Y. New corp. $6,000.

Hardy Sand & Gravel Co., D. W. Gray, Millersburg, Ohio. New corp. $15,000 and 250 shares n.p.v. (Previously reported as Mardy Sand & Gravel Co.)

Cove Creek Mining Corp., Abe Williams, Pres., Bluefield, Va. New corp. $25,000. To produce graphite. George T. Hypes, Sec.; George Asbury, V. P. Mineral will be hauled by trucks to Rocky Gap, where it will be loaded on railroad for shipment.

LEGAL INFORMATION FOR OPERATORS

When Railway Company Is Liable for Shipper's Repair Express on Cars

Generally speaking, a shipper is permitted to make minor repairs on freight cars and charge the expense to the railway company. However, only reasonable expenses are collectable. This point of the law was discussed by the higher Court in the case of Highway Stone Co. v. St. Louis-San Francisco Ry. Co., 21 S. W. (2d) 1.

In this case it was shown that a person was engaged in shipping crushed stone, chats, and sand, to be used chiefly in road building. He contracted to furnish three to five cars of sand per day, as well as large quantities of rock and chats, and he agreed to make prompt shipment in order to fulfill his contract. About one-half the cars furnished by the railway company were unfit for the purpose because of holes in the floor and cracks in the sides of the cars, through which the sand would leak out. The shipper did not reject the cars and wait for others, because of the necessity for immediate use of the cars, and for that reason he made repairs on them by nailing boards over the holes in the floors and strips over the cracks in the sides of the cars or by stopping these cracks with burlap. He kept an account of the number of the cars on which he made repairs and the amount expended for material and labor.

The railway company refused to pay the bill and the shipper filed suit. In view of the fact that the testimony tended to prove that the shipper had entered charges for labor and material for repairing small holes in cars used to ship large-size rock, the Court held the railway company not liable for the repair expenses, stating the following important law:

"The general rule, as we understand it, is that it is the duty of the railroad to furnish cars suitable for use in making the particular shipments for which they are ordered and, if they are used by the shipper without discovering or being charged with notice of their condition and damage results, he can recover. On the same principle, if he does discover the defect and cannot reject the car and wait for another to be furnished without material loss to him, and he can, at slight expense, repair the car and save loss that would likely occur, it would be better for both him and the carrier that he make the repairs and prevent the loss or damage, and in that case the carrier could better pay the cost of slight repairs than to pay the damage that would result if the repairs were not made. If the shipper discovers the defect and can without material loss to himself reject the car and wait for another to be furnished, he should adopt that course, for, except in emergency cases, it is the right as well as the duty of the carrier to repair its own cars and the shipper cannot perform that duty for the carrier unless the peculiar circumstances of the particular case make it necessary for the protection of the shipper."

When Employer Is Liable For Acts of Contractors

Usually a principal contractor is not liable for negligent acts of a subcontractor who is paid on a "piece work" basis, if the principal contractor retains no control over the subcontractor.

For example, in Ellis v. Lewis, 20 S. W. (2d) 320, an employer employed several owners of motor-trucks to haul rock. These haulers furnished their own trucks and were paid 20 cents per ton for each mile the material was hauled. One of the haulers drove his truck into a pedestrian who sued the employer. However, the Court held the employer not liable, saying:

"Generally, when an independent contractor is employed to perform work lawful in itself and not intrinsically dangerous, the company (employer) . . . is not liable for the wrongful acts or negligence of such subcontractor and in order that the principal contractor shall be liable in such a case it must appear that it either exercised or reserved the right to exercise control over the work, or had the power to choose, direct and discharge the employees of the subcontractor. In general it may be said that the liability of the company depends upon whether or not it has retained control and direction of the work."

Liability for Injuries Caused By Explosives

Since considerable controversy has arisen from time to time with respect to liability of an employer for injuries caused by explosives, the recent case of Watson v. Warsaw Const. Co., 150 S. E. 20, imparts valuable legal information.

In this case a foreman of a quarry directed a teamster, eighteen years of age, to deliver a box of dynamite caps to a shack in which explosives were stored. The teamster put the box in his pocket and upon arrival at the shack be put the box where he was told to lay it. The next day a cap, which undoubtedly had escaped from the box and remained in his pocket, exploded and effected serious injury. He sued his employer for damages on the contention that the employer was negligent. However, the Court held the employer not liable, stating important law as follows:

"It is conceded to be the duty of an employer to warn his employees concerning dangers which are known to him or which in the exercise of reasonable care should be known to him, and are unknown to his employees or are undiscoverable by them in the exercise of due care, and concerning dangers which, by reason of youth, inexperience, or incompetency the employees do not appreciate. Under these conditions, unless the servant is warned or instructed, he does not assume the risk of such dangers and if, without fault or negligence on his part, he receives an injury in consequence of not having been warned or instructed, the master will be liable to him in damages. . . . Foresight of harm is a condition of liability, the test of the defendant's negligence being whether, in the exercise of due care, it could have foreseen, not necessarily the specific injury sustained, but consequences of a generally injurious nature. While an employer may be charged with knowledge of that which as a reasonably prudent person he should have foreseen, he is not under any duty to foresee what a reasonably prudent person would not have foreseen, or under any obligation to provide against a danger he would not reasonably have anticipated. . . . No act or omission, though resulting in damage can be deemed actionable negligence unless the one responsible could by the exercise of ordinary care, under all the circumstances, have foreseen that it might result in damage to some one."

Mistakes Adjusted After Acceptance

An important point of the law is that any mistake, with respect to the quality, price or quantity of the goods, may be corrected after acceptance

and appropriation of the shipment providing such mistake is mutual.

For instance, in the leading case of Acme Co. v. United States Zinc Co., 278 Pac. 1083, it was disclosed that a purchaser and a seller entered into a contract by the terms of which the latter agreed to deliver to the purchaser's plant merchandise at $6.60 per ton. Later the purchaser sued the seller to recover $1,448 contending that when the contract was made both parties had figured the freight rate at $4.10 per ton and the rate had been changed, whereby the seller paid only $2.50 per ton, thus leaving the difference for which the suit was filed.

During the trial the purchaser introduced letters showing that although the contract price was $6.60 per ton f. o. b. the purchaser's plant, the seller had based the price upon $2.50 per ton, plus the freight rate of $4.10.

In view of this testimony the Court held the seller bound to repay $1,448 to the purchaser since the mistake of figuring the freight rate was mutual.

Cement Seller Not Entitled To Recover Payment From Bonding Company

The law is well established that a seller of cement, or other products, to a contractor in violation of the contract between the contractor and the owner or with the bonding company, is not entitled to recover payment from the latter if the contractor is financially unable to make the payments.

For example, in Piel Const. Co. v. Commonwealth of Pennsylvania, 35 F. (2d) 265, it was disclosed that a construction company entered into a contract with the state of Pennsylvania to build a concrete highway and furnished a bond which guaranteed materialmen and subcontractors payment for all material and labor furnished in completion of the highway.

A seller of cement furnished the required cement and accepted $30,000 in notes from the construction company in payment for a portion of the material used. Later the construction company went into bankruptcy and the seller of the cement sued the bonding company to recover payment. The latter defended the suit on the grounds that, when accepting the notes in payment, the seller of the cement had violated the terms of the bonding contract which provided that the construction company should pay cash for all material.

It is interesting to observe that the Court held the seller not entitled to recover payment from the bonding company and said:

"When, however, Hendricks (seller) accepted $6,741.45 of notes in lieu of cash, he departed from the contract. It is not worth while to discuss the proposition that such a course of dealing materially changed the terms of payment originally agreed upon and assured insofar as they related to that sum. . . . Moreover, if Hendricks had struck to the contract method of payment, these notes should not have been given and naturally the Piel Construction Company whould not have defaulted in its payment and no demand would have been made upon the Casualty Company for indemnity."

When Materialman Is Entitled To Mechanic's Lien

In Kellison v. Godfrey, 281 Pac. sued to enforce a lien to secure pay-733, a contractor and materialman ment for material delivered on a lot *after* the house thereon was fully completed. The higher Court refused to allow the lien, saying:

"The material respondent claimed to have furnished, for use in the building against which a lien is sought, was not capable of being incorporated in the structure at the time of delivery of the material on the premises by reason of the fact that the house was then fully completed."

However, in Huttig Bros. v. Denny Co., 6 Wash. 122, certain materials were specially designed for a building and the Court held that a lien could be enforced for the *whole* amount furnished, although *only a portion* had been used in the construction. In this case however, the materialman was not at fault because the contractor, employed by the owner to construct the building, abandoned the work before the building was fully completed.

Legal Meaning of "Prompt And Efficient"

Many contracts contain such expressions as "satisfaction guaranteed" and "prompt and efficient service assured." Such terms as these are not interpreted strictly in accordance with their true meaning.

For instance, in El Dorado v. Oakland, 281 Pac. 399, a Court explained the law:

"The question of what is prompt and efficient service, like the question of due negligence, is one which must be determined from all the circumstances of each particular case, except in cases where but one reasonable inference can be drawn from the undisputed facts."

A. R. B. A. Makes Survey Of 1929 and Estimates 1930

According to statistics collected in November, 1929, by the American Road Builders' Association, the total expenditures by state highway departments for the construction of roads and bridges were $591,520,000 in 1929. It estimates that these departments will expend $629,000,000 in 1930 for similar work or an increase of $37,480,000 for 1930 over 1929. It is almost assured that, although highway construction reached its peak in 1929. the construction program for 1930 will establish a new high level for road building. The figures compiled do not include maintenance which, in 1930, should considerably exceed 1929.

In addition to the expenditures noted, there will be large expenditures by counties, townships, municipalities and other subdivisions. While no definite figures are available, there is no question but that a largely increased amount of street paving is to be carried out by the various cities in 1930. Highway construction must increase from year to year for an undefined period in order to keep abreast of the march of modern progress.

Various State Highway Departments Expenditures on 1929 Construction Programs and Proposed 1930 Construction Programs

State	A. R. B. A. Survey 1929	1930
Alabama	$ 6,000,000	$ 6,000,000
Arizona	7,200,000	7,000,000
Arkansas	17,400,000	17,000,000
California	25,200,000	25,000,000
Colorado	6,000,000	6,000,000
Connecticut	12,400,000	12,400,000
Delaware	2,500,000	1,500,000
Florida	11,500,000	10,500,000
Georgia	10,800,000	12,000,000
Idaho	2,930,000	3,300,000
Illinois	31,000,000	26,000,000
Indiana	13,800,000	12,400,000
Iowa	29,000,000	30,000,000
Kansas	8,600,000	8,000,000
Kentucky	9,800,000	11,000,000
Louisiana	14,800,000	14,800,000
Maine	9,200,000	8,500,000
Maryland	10,200,000	9,500,000
Massachusetts	13,100,000	10,000,000
Michigan	16,500,000	24,000,000
Minnesota	9,800,000	11,000,000
Mississippi	None	None
Missouri	25,000,000	25,000,000
Montana	6,890,000	4,500,000
Nebraska	5,000,000	6,000,000
Nevada	1,500,000	1,600,000
New Hampshire	3,600,000	5,800,000
New Jersey	32,900,000	35,500,000
New Mexico	2,500,000	3,300,000
New York	40,000,000	62,000,000
North Carolina	6,000,000	6,000,000
North Dakota	3,900,000	3,000,000
Ohio	18,400,000	23,500,000
Oklahoma	14,200,000	12,000,000
Oregon	4,700,000	4,000,000
Pennsylvania	44,000,000	44,000,000
Rhode Island	1,700,000	4,000,000
South Carolina	10,900,000	20,000,000
South Dakota	3,100,000	3,500,000
Tennessee	22,100,000	12,000,000
Texas	18,000,000	30,000,000
Utah	2,200,000	2,200,000
Vermont	5,500,000	3,000,000
Virginia	11,000,000	12,500,000
Washington	10,700,000	10,700,000
West Virginia	11,600,000	10,800,000
Wisconsin	16,300,000	15,500,000
Wyoming	2,100,000	2,700,000
Total	$591,520,000	$629,000,000

TRAFFIC NEWS AND COMMENT

Limestone Originating At Valmeyer

Central Freight Association Docket No. 23627 proposes to establish rates on limestone, crushed or ground, carloads from Valmeyer, Ill., to the following points which are representative.

TO	Present Rate	Proposed Rate
Akron, Ohio	$6.10	$4.00
Columbus, Ohio	5.40	3.50
Cincinnati, Ohio	5.00	3.30
Cleveland, Ohio	6.10	4.00
Toledo, Ohio	5.70	3.70
Youngstown, Ohio	6.40	4.20
Detroit, Mich	5.90	3.80
Grand Rapids, Mich	5.90	3.80
Evansville, Ind	3.70	2.40
Ft. Wayne, Ind	5.20	3.40
Indianapolis, Ind	4.40	2.90
South Bend, Ind	5.20	3.40
Louisville, Ky	4.70	3.10
Pittsburgh, Pa	7.00	4.60

The proposed rates are 65 per cent of sixth class.

Ground or Pulverized Limestone

For a number of years the railroads have maintained rates on Ground or Pulverized Limestone from producing points in Central Freight Association territory to destinations in Canada, based on 80 per cent of the sixth class rates.

They are now considering the cancellation of the basis with a view of re-establishing the full sixth class rates. This action would result in an increase of 25 per cent.

Central Freight Association Docket 23716 covers the subject.

Crushed or Ground Limestone

The Illinois Central Railroad has under consideration the publication of new rates on Crushed or Ground Limestone in bulk, or in sacks or barrels, minimum weight 60,000 pounds from Roseclaire, Ill., to various destinations on its line in Illinois, also St. Louis, Mo. At the present time no commodity rates are in effect.

The proposed rates as announced in Illinois Freight Association Docket 5393 are shown below:

TO	Proposed Rate
Chicago, Ill	2.90
Peoria, Ill	2.70
Springfield, Ill	2.50
Bloomington, Ill	2.60
Decatur, Ill	2.50
Mattoon, Ill	2.50
Neoga, Ill	2.50
Effingham, Ill	2.40
Pana, Ill	2.00
Centralia, Ill	2.00
St. Louis, Mo	2.00

Silica Rock

Central Freight Association Docket No. 23616 proposes establishment of rates on silica rock (ground) carloads from St. Clair, Mo., to destinations in Central Freight Association territory.

The proposed basis is 10 cents per ton higher than the present rates from Pacific, Mo.

Sand from Butler, Pa.

A shipper has asked the Central Freight Association railroads to reduce the present rates on Sand (except blast, core, engine, filter, fire or furnace, foundry, glass, grinding or polishing, loam, moulding or silica sand) from Butler, Pa., to the Ohio destinations shown below. The subject is covered by Central Freight Association Docket 23678.

The following are the proposed rates and present rates, in cents per ton:

TO	Proposed Rates When in Open Top Cars	Proposed Rates When in Open Box Cars	Present When in Open Top or in Box Cars
Alliance	120	138	150
Ashtabula	100	115	120
Canton	120	138	160
E. Liverpool	100	115	150
Elyria	130	149	140
Lorain	140	161	130
Medina	120	138	150
Salem	110	127	120
Steubenville	100	115	110
Warren	90	104	100
Youngstown	80	92	100

The proposed rates on shipments in box cars are based 115 per cent of the open top car rate.

Sand and Gravel

Central Freight Association Docket No. 23,276 is proposal to establish rates on sand and gravel, carloads, from Dresden, Ohio, as follows:

To	Miles	In cents per ton of 2,000 lb. Proposed rate	Present rate
Lore City, O	49	95	90
Gibson, O.	51	85	105
Salesville, O.	56	90	105
Quaker City, O	58	90	105
Barnesville, O	66	95	105
Bethesda, O	72	95	140
Belmont, O.	74	95	140
Neffs, O.	88	100	140
Bellaire, O.	93	105	140
Cumberland, O	..	105	110

Illinois Freight Association Docket 5,315 proposes establishment of new commodity rates on sand and gravel from Cordova, Ill., on the C. M. St. P. & P. to destinations in Illinois on the C. & N. W., C. B. & Q., and the C. R. I. & P.

The docket contemplates the establishment of the following rates:

Distance	Proposed Rate
5	$0.80 per net ton
35	.90 per net ton
60	1.10 per net ton
90	1.20 per net ton
125	1.20 per net ton

Sand and Gravel

In Central Freight Association Docket 23,040, a shipper asks that the rates on sand and gravel from Peru, Ind., to various stations in Indiana located on the Erie Railroad be reduced to the basis now applicable under the so-called "Kickapoo Scale."

The rates sought are as follows:

To Bippus, Ind	$0.90
Bolivar, Ind.	.85
Bass Lake, Ind	.85
Pershing, Ind.	.80

Asphalt Rock From Texas Points

Southwestern Freight Bureau Docket 18,957 covers a shipper's request for a mileage scale of rates on asphalt rock from Texas points to stations in the States of Arkansas, Louisiana and Oklahoma.

The shipper asks that the scale be made applicable on asphalt rock, natural or coated with not to exceed 5 per cent of road oil, crushed or ground, from Cline and Uvalde, Texas, also from stations on the Asphalt Belt Railway, as well as from other points of origin at which the commodity may be produced in the future.

The following rates in cents per ton are typical of the rates sought:

Distance	Single Line	Joint Line
10	70c	90c
20	80	100
50	105	125
100	130	150
150	155	175
200	180	200
350	235	245
500	285	285
710	350	350
860	390	390
1000	415	415

Rates on Feldspar from Warroad, Minn.

A shipper of feldspar located in Minnesota has asked the Western Trunk Line Committee (its docket 6141-C) to establish the following rates:

To	Proposed Rates
Sioux Falls, S. D	$0.28
Des Moines, Ia	.27½
Newton, Ia.	.27½
Waterloo, Ia.	.27½
Kansas City, Mo	.30
Omaha, Neb.	.30
St. Louis, Mo	.30
Sioux City, Ia	.30

Sand and Gravel Rate From Ohio Points

Central Freight Association Docket 23684 covers an application for reduction in rates on sand and gravel from

Marietta and Gravel Bank, Ohio, to various destinations on the B. & O. R. R. in West Virginia.

The proposed as well as the present rates (in cents per ton) are as follows:

TO	Proposed Rate	Present Rate
Silverton	90	80
Crow Summit	100	90
New Era	100	90
Sandyville	100	90
Meadowdale	100	90
Duncan	100	90
Liverpool	100	90
Seaman	100	90
Dukes	100	90
Reedy	100	90
Billings	110	100
Barrs	110	100
Nancy's Run	110	100
Spencer	110	100
Cottageville	100	90
Angerona	100	90
Evans	100	90
Ripley	100	90
Hallen	80	70
Creels	80	none
Dewey	80	none
Placid	80	none
Base Station	80	none
Cool Spring	80	none
Leachtown	80	none
Slate	80	none

At the request of a shipper the railroads are considering the establishment of a new line of rates on Sand and Gravel from South Lebanon, Ohio, to various stations in Ohio on the B. & O. R. R. Central Freight Association Docket 23612 contains the proposals of which the following are illustrative.

TO	Proposed Rates in Cents per Ton
Finney	85
Columbia Park	85
Madeira	80
Blanchester	80
Martinsville	80
New Vienna	80
East Monroe	85
Greenfield	90
Harpers	90
Musselman	95
Chillicothe	100
Cuba	80
Bloomingburg	85
Mt. Sterling	90
Pleasant Corners	95
Broad Street	100
Westboro	80
Hillsboro	85
Glendale	80
Hamilton	80
Trenton	80
W. Middletown	80
Carlisle	85
Miamisburg	85
Jamestown	80
Milledgeville	85
Cunningham	90
McLean	85
Austin	90

MANUFACTURERS' PUBLICATIONS

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when making such requests.*

Belting

"Deterioration of Belting with Age." 4 p., 1 ill. (*Black and White*, Feb. 1930. E. F. Houghton & Co., Philadelphia, Pa.) Discusses the effect of age on tensile strengths of various types of belting and suggests remedies.

Concrete Mixers, Transit

To Help You Cut Costs. 4 p., 4 ill. (Lee Transit Mixer Co., Indianapolis, Ind.) Describes and illustrates a new 1-cu. yd transit mixer which may be attached to any light truck.

Conveyors, Portable

The Stacker. 4 p., 5 ill. (Bulletin No. 12, Greenville Mfg. Works, Greenville, O.) Describes and illustrates a portable belt conveyor.

Conveyors, Shaker

Conveyor Mining Hints. 20 p., 56 ill. (Bulletin M-3, Conveyor Sales Co., Inc., New York, N. Y.) Describes and illustrates the installation of shaker conveyors in underground mining.

Crushers

A Crusher That Crushes! 6 p., 3 ill. (Kennedy-Van Saun Mfg. & Eng. Corp., New York, N. Y.) Describes and illustrates roll, jaw and gyratory crushers of various capacities.

Wheeling Crushers. 4 p., 3 ill. (Wheeling Mold & Foundry Co., Wheeling, W. Va.) Describes and illustrates a new jaw crusher, with specifications and capacities tabulated.

Engines, Diesel

Primm Low Pressure Diesel Oil Engines. 24 p., 14 ill. (Bulletin E-1, The Power Mfg. Co., Marion, O.) Discusses the relative merits of oil engines as compared with other types. Describes and illustrates various sizes of diesel oil engines.

Hoists

Utility Hoists. 2 p., 4 ill. (Lidgerwood Mfg. Co., Elizabeth, N. J.) Describes and illustrates new chain drive hoists with opposed friction brakes.

Machinery, Used

Zelnicker's Bulletin. 6 p., 6 ill. (Bulletin 394, Walter A. Zelnicker Supply Co., St. Louis, Mo.) Lists used equipment for the pit and quarry field.

Power Transmission

Power Transmission Machinery. 248 p. (Catalog No. 1924, Diamond Iron Works, Minneapolis, Minn.) A complete catalogue profusely illustrated, of all types of power transmission equipment. Many valuable tables and calculation data included.

Pumps, Dredge

Erie High Duty Dredge Pumps. 28 p., 35 ill. (Erie Pump & Engine Works, Medina, N. Y.) Describes and illustrates several types of dredge pumps and shows their application in a number of interesting jobs.

Sand and Gravel Plants

Sand and Gravel Equipment. 28 p., 41 ill. (Diamond Iron Works, Minneapolis, Minn.) A catalogue of complete equipment for sand and gravel plants. Separate machines described and illustrated.

Screens, Vibrating

The S-A Vibrator. 16 p., 21 ill. (Stephens-Adamson Mfg. Co., Aurora, Ill.) Describes and illustrates a new vibrating screen. Construction details, capacity data and installation photographs are included.

Shovels

The Ace Gasoline Shovel. 8 p., 13 ill. (Western Mfg. Co., Detroit, Mich.) Describes and illustrates a new full swing gasoline shovel and lists specifications.

One-Man Economy for Contracting and Industry. 2 p., 3 ill. (Trackson Co., Milwaukee, Wis.) Describes and illustrates a new crawler-mounted shovel.

Steel Treating

Steel Treating Instrument Data Book. 32 p., 27 ill. (The Brown Instrument Co., Philadelphia, Pa.) Describes problems and practices of modern steel treating and illustrates current methods.

Welding

"Ready for the Next Big Job." 2 p., 4 ill. (*Oxy-Acetylene Tips*, Jan. 1930. Oxweld Acetylene Co., New York and Chicago.) Describes and illustrates how heavy castings are reclaimed by welding at a western cement plant.

Oxwelded Piping. 20 p., 41 ill. (The Linde Air Products Co., New York, N. Y.) Describes and illustrates welding as applied to the installation of industrial piping.

Manufacturer's Magazine Changes Its Title

Many of our readers are familiar with a house organ known as *Mine and Quarry* which was published at intervals since 1906 by the Sullivan Machinery Company, Chicago; and they were surprised, probably, when they recently received the first issue of a new magazine which supersedes *Mine and Quarry* and is named *Engineering Graphic.* The new publication will appear quarterly. "The new title indicates the broadened scope of the publisher's activity in reaching old phases of industry, as well as the development and exploitation of minerals," says page 1, volume 1, number 1.

INSURANCE PROBLEMS DISCUSSED

Automobile Liability

Aside from a comparatively few misinformed individuals who do not realize the risks involved in running an automobile today, every car owner is seriously concerned about the subject of automobile liability insurance. Two big questions which must be faced are the choice of insurance company and the size of policy.

But still another question arises which leads to very much misunderstanding and dissatisfaction with insurance companies. The general public commonly believes that every time there is an accident someone should pay for the damage. One might say, that is, that liability insurance is just the converse of collision insurance. Where collision insurance pays for damage to your own car, regardless of who caused the accident, liability (and property damage) insurance should pay for all damage to the person and car of "the other fellow." Unfortunately, however, it is impossible to write a policy which would agree to pay on this basis. Insurance policies cover your legal obligations, but not good wishes or moral obligations. In the case of accidents where both car drivers were equally at fault or where both were guilty of contributary negligence, neither side can collect. When you buy a liability and property insurance policy, therefore, you should realize that you are getting full protection against any legal claim for damages, rather than a blanket promise to pay every time you hit someone.

The legal liability for automobile accidents is growing constantly. In the case of children struck by cars, the tendency of courts and juries is to assess damages against the motorist even when the child virtually ran into the car, on the grounds that a child cannot be expected to look out for himself. Truck owners should be especially warned about this tendency of courts to hold the motorist responsible for damages, because in many cases the truck owner has been held liable for injuries to someone riding on the truck by invitation of the driver.

Employes' Cars

One of the most troublesome problems for a business concern is the matter of the employer's responsibility for the actions of employes who use their own cars for business purposes. Of course, where the employer owns the car he will remember to protect himself with liability insurance. There are many, many cases, however, where employes use their own cars without much thought on the part of the employer. These cases run all the way from the salesman who uses his own car day in and day out, the executive who "goes to the bank for the firm" on the way to lunch, to the man who takes his own car just to help the firm in some emergency.

Obviously the employer is somewhat responsible for all the actions of employes in line of duty. Whether the employer is liable for damages depends on how much control he has over the operation of the car in each specific case. For example, if "the boss" says to one of his men, "Take this over to So-and-so as fast as you can, and to save time you had better go along Such-and-such a street,"—it is pretty clear that the employer has control over the car. If the employe is free to choose his own speed, route and time for making a certain trip, the connection between the employer and any accident is not so clear. In summary. therefore, you should realize that the employer may be held liable for damages any time an employe uses his own car for business purposes. Whether damages are assessed depends on the opinion of an individual judge or jury. This makes the situation so risky that you should not allow an employe to use his car in your business unless you either require him to carry adequate insurance covering you as well as himself, or else you yourself should buy a so-called "contingent liability" insurance policy which will protect your own interest in the operation of his car.

Size of Policy

Granted that every car owner should carry liability insurance and every employer should require that his employes do the same, there comes the practical question of what kind of policy to take out. The choice of insurance company we shall discuss in a future article. Right now we want to consider the size of policy.

The daily newspapers are constantly running stories of damage awards in automobile accidents running up to large sums, such as $25,000, $35,000 and even as high as $65,000. Does this mean then that you should have a policy with limits of at least $65,000 in order to feel safely that you have full coverage? That depends on who you are. It is to some extent a matter of what you are worth. Juries unconsciously appraise the men on trial. They probably would never award a tremendous sum against a clerk who could not possibly hope to pay it. On the other hand, the action of juries is determined not so much by what you are worth as by what you look like. If you are the officer of a corporation or dress like a successful business man, a jury might hit you hard enough to force you into bankruptcy. You should try to imagine what you would look like in front of a jury and carry a policy of such substantial limits that your insurance company would be forced to settle any damage claim without daring to let it come to trial.

Property Damage

Liability insurance is of two sorts. What we ordinarily call liability insurance means the indemnity for injuring persons. What we call property damage insurance is also a form of legal liability, and covers the car owner's responsibility for damage to the property of others. The common type of policy, which covers damages up to $1,000, is probably adequate for the owner of a passenger automobile. In the case of trucks, however, the basic limit of $1,000 is insufficient. Trucks frequently do more than $1,000 worth of damage to property of others. Trucks run over the sidewalk and wreck store fronts, they knock off fire hydrants and thereby flood nearby basements, and they sometimes completely wreck Cadillacs and Lincolns. The excessive weight of a truck means that when it gets out of control it does much more property damage than a passenger automobile. Truck owners, therefore, should carry policies with limits of $5,000 or even higher.

Merit Rating Plan

The large standard insurance companies are engaged now in a study of automobile accidents with the purpose of giving special rates to motorists who have a good record for careful driving. At the present time a reduction in rate of ten per cent is given to the owner of a passenger automobile who has owned a car for the preceding two years and has had no accident within that period (the last three months being excluded). This so-called "merit rating plan" will probably be extended as soon as more adequate statistics are available. Trucks are not subject to this reduction, because most trucks are insured under fleet policies, covering all the trucks owned by a single concern, and the rate for the entire fleet contains a credit or debit for the average accident experience of all cars.

REVIEW OF FOREIGN PRACTICE

Excavating By Means Of Endless Track Vehicles

In an excavator crane or the like, with a carriage supported as on endless tracks, and carrying a table capable of rotating or swinging and on which a prime mover is mounted, controllable means are provided whereby the power unit may drive the supporting apparatus or cause rotary movement of the table simultaneously or separately. As shown (Fig. 1) a carriage 10 is supported on endless tracks 14 passing over sprockets 13 and provided with auxiliary rollers 15; the carriage carries a hollow shaft 23 about which is pivoted a table 20 supported on rollers 22. The table carries an internal combustion or other motor 46 with transmission gear 48, one shaft 48¹ of the latter controlling table swinging gear while a further shaft 50 controls carriage driving gear; table swinging and carriage driving may be effected simultaneously under control of clutches operated by means shown diagrammatically but governed by suitably grouped levers. The carriage driving and steering means are controlled as follows: The shaft 50, through clutch 51 and bevel gear 44 drives loose bevel gears 40, 41, either of which may be connected by a clutch 43 to the hollow shaft 23 about which the table pivots; the shaft 23 through gears 39, 38 and bevel gears 36, 35, drives a transverse shaft 27 on which are loose sleeves connected by chains 31 to the forward sprockets 13 of the endless tracks 14. Clutch members 34 on the hollow sleeves are adapted to lock the latter through clutch teeth 30 to the carriage to lock the respective endless track or to lock the sleeves to members 32 on the shaft 27, whereby the endless tracks are driven. The clutches 34 are operated by pivoted levers 55 connected through links 59 and bell cranks 60 to vertically-movable concentric shafts 62, 63 passing through the hollow shaft 23 and connected to actuating levers 71, 75 on the table 20. The table swinging means is operated by the shaft 48¹ which is connected by a chain 83 to a shaft 79, first and third sections of illustration connected by gears 81, 80 to a shaft 78; hubs 84, 89 are loose on the shafts 78, 79 and connected by a chain 95, the hub 89 being also connected by a chain 108 to a transverse shaft 106 which through bevel gearing 110, 111,

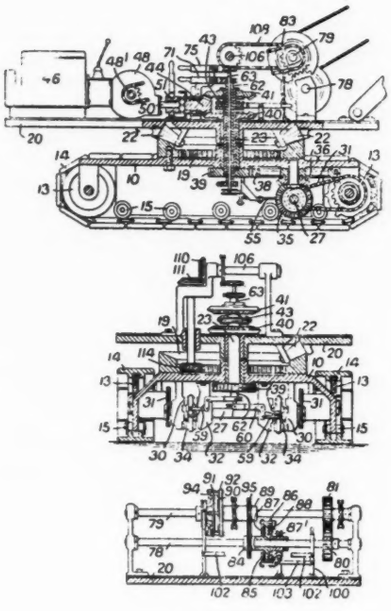


Fig. 1

second section of illustration, is connected to a pinion 114 engaging an internal gear 19 fixed on the carriage 10. Sir G. C. Marks, (British Patent 318, 739).

Calcium Sulpho--Aluminate Cement

A hydraulic binding material consists of an intimate mixture of aluminous cement, prepared by melting, clinkerizing or fritting, and calcium sulphate in any form, such as gypsum, anhydrite or more or less burned plaster. The proportions are preferably such that all the alumina is converted into calcium sulphoaluminate and the mixture usually contains from 20 to 50 per cent of calcium sulphate. Other proportions of from 5 to 95 per cent of either ingredient may, however, also be used. The calcium sulphate is added to the raw material of the aluminous cement, the mixture being then heated without melting.—Soc. Onon. des Chaux et Ciments de Lafarge et du Teil (British Patent 317,783).

Cement Moduli and Quality Factor

The Kühl formula for the "best" possible cement.

$$CaO = 2.8\ SiO_2 + 1.1\ Al_2O_3 + 0.7\ Fe_2O_3$$

can be easily replaced by an identical modulus formula. Such a formula makes the valuation of an analyzed cement considerably easier. By substitution of the hydraulic modulus H, the silicate modulus S and the iron makes the valuation of an analyzed modulus E in the Kühl formula, this then takes the following form:

$$H = \frac{2.8\ S\ (E + .1) + 1.1\ E + 0.7}{(S + 1)\ (E + 1)}$$

This formula contains only three moduli, H, S and E and if any two are fixed, the third is determined. If values for E and S are assumed, H has a definite value, as shown in the curve (Fig. 2) where the relation between H and S is shown for three different values of E. In judging a clinker or cement analysis, by calculation of the three moduli, and comparison with the curve, it may be determined how closely the hydraulic modulus approaches the "ideal" value. The quotient of the actual with the ideal gives the "quality factor." A Nilsson (*Zement*, Nov. 21, 1929).

Excess Gauging Water

Tests were made to see if an excess of gauging water in a cement mortar would really cause a decrease in strength to persist indefinitely, or if this strength loss would be made up on long curing. In no case did the highest strength of the very wet mortars reach the 3-day strength of the "earth-moist" mortars, no matter how long the curing continued. The loss in strength of the very wet mortars was relatively always the same as compared with the earth-moist samples. The percentage decrease in strength of the wet mortars was essentially the same after long curing, as on the first day of the tests. — H. Richarz (*Tonindustrie-Zeitung*, Nov. 18, 1929).

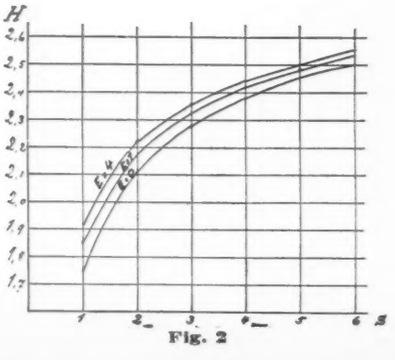


Fig. 2

LATEST NEWS FLASHES

Merged Companies Adopt Corporate Title

The business of Atlas Portland Cement Co. and Universal Portland Cement Co. is now conducted by Universal Atlas Cement Co. The Atlas and Universal organizations were brought together through the Atlas sale to the United States Steel Corporation, of which the Universal company is a subsidiary.

The Atlas and Universal companies have grown up with the cement industry. Each is a third of a century old. The same general policies under which they have operated continue. The combined productive capacity and sales territory will make cement of the joined companies more readily available to an increased number of cement users and thus improve the service to customers. The new company assumes all the obligations of the Atlas and Universal companies so that relationships between buyer and seller are unchanged.

Plants of Universal Atlas Cement Co. are at Hudson, N. Y., Northampton, Pa., Universal, Pa., Buffington, Ind., Duluth, Minn., Hannibal, Mo., Independence, Kan., Leeds, Ala., and Waco, Texas. Offices are in Chicago, New York, Philadelphia, Boston, Albany, Pittsburgh, Cleveland, Columbus, Minneapolis, Duluth, St. Louis, Kansas City, Des Moines, Omaha, Oklahoma, Oklahoma City, Birmingham, and Waco.

Daniels Sand Changes Ownership

Daniels Sand and Building Company, Harriman, Tenn., has been bought by Geo. J. McAfee, president; J. H. Agee, vice-president; and C. B. Alexander, secretary-treasurer; all associated in various capacities with the Oliver King Sand and Lime Company. The office of the Daniels plant has been moved to the King Company offices in South Knoxville, Tenn. Dredging capacity will be doubled immediately.

Puget Sound Tug & Barge Buys Hat Island Gravel

Purchase by the Puget Sound Tug and Barge Company of Seattle, of nearly three-fourths of the total acreage of Hat Island, approximately five miles west of Everett, Pa., in Puget Sound, was announced. The company is drilling test holes and plans to develop the gravel deposits of the island on a large scale, offering a closer source of supply for construction operations, particularly in Seattle, Wash.

The purchase, covering more than 200 acres, was made from Dr. L. J. Mitchell, of London and Monte Carlo, owner of extensive interests in Everett. The principal gravel bed is in a cliff 300 feet high at the water's edge, the upper 100 feet being all gravel. The topography of the island is such that these deposits are easily accessible.

The company is considering using the hull of the old motorship Boobyall, which it recently purchased, as a breakwater at the point where gravel is to be loaded on barges. The hull would be filled with gravel and partly submerged.

Southern Feldspar Has Many Orders

The Southern Feldspar, Inc., of Toecane, N. C., is running its mill day and night in order to meet the demand for its ground feldspar. It was recently awarded an order by a large pottery concern for two 50 ton cars of ground feldspar to be delivered each week during the present year, and is receiving orders from other potteries. At present, the company is shipping six car loads a week of high grade potash feldspar, used in making glass and pottery ware.

The Southern Feldspar company expects to double its daily output within the next few days, it is said, as the potteries over the country, resume their normal business conditions after the holidays. It is operating the Staggerfork mines, located near Hawk, on Cane Creek Mountain, recently leased from Aaron Buchannon, of Hawk, N. C.

A hard surfaced road has been built from Toecane to the operations and it is brought by eight trucks to the plant. Recently the company installed an electric Ingersoll-Rand air compressor, capable of driving six jackhammers at one time, at the foot of the mountain. Operations will soon begin at six different places in the large vein.

Reiner Moves Offices

John Reiner and Company, Inc., which represents the Climax Engineering Company, Power Manufacturing Company, Novo Engine Company and the Twin Disc Clutch Company, has moved its offices to 290 Hudson Street at Spring Street, New York, N. Y.

Dewey Portland Gives Annual Bonus Dinner

The Annual Bonus Dinner of the Dewey Portland Cement Company of Dewey, Okla., was held Jan. 6, 1930, in the Employees' Association Building with D. M. Tyler, assistant general manager, presiding.

H. F. Tyler, first vice-president, who is in charge of the Davenport, Ia., plant, delivered an address on "Loyalty." The reward for loyalty in the form of bonus checks to the amount of $21,000 distributed among the 228 employees was the event of the evening. The annual bonus is based on the yearly profit of the company, the length of the service of the individual and his income for the preceding year.

The building in which the meeting was held is a large structure in the heart of Dewey in which most of the social activities of the town are held, and includes a gymnasium and library. The Portland Cement Association presented a 100 per cent First Aid Certificate to the Dewey plant which occupies a prominent place in the building. The plant boasts of having 12 drilled and certified First Aid teams. It is planned to have a Dewey team to represent the plant at the Regional Meeting of the Accident Prevention and Insurance Bureau of the association to be held in Kansas City March 25, 1930.

Worthington Issues Announcement

On and after January 2, 1930, the interests of that corporation in the California territory will be served through a local company, the Worthington Machinery Corporation of California, Ltd., with headquarters at Los Angeles and San Francisco. H. D. Cornell, who has been president of the Worthington Machinery Corporation of Oklahoma, will be president of and direct the new corporation, moving to California for that purpose. George W. Hawkins, who was formerly director of sales, will also go with Worthington-California, as vice-president.

The Worthington Machinery Corporation of California, Ltd., will take over the sales and engineering staff and the warehouse facilities of the Worthington Company, Incorporated,

in California, and will hereafter handle all that territory. This arrangement will enable the carrying of larger and more diversified stock of Worthington products and parts, and give more prompt service to the increasing number of Worthington friends and customers in California. It feels that it will be able to serve patrons more acceptably and promptly under the new arrangement, and solicits the same good-will and consideration shown in the past.

Allis-Chalmers Opens New Office

Allis-Chalmers Manufacturing Company announces the establishment of a Chattanooga sales office, 633-634 Tennessee Electric Power Building, this office with D. S. Kerr, as representative in charge and A. I. Richardson, sales engineer, will operate as a branch of the Atlanta district office under the direction of Berrien Moore, district manager. With the establishment of this office, the company will be able more effectively to serve its many customers in Eastern and Central Tennessee.

Standard Gypsum Moves Offices

Standard Gypsum Co., Seattle, announces the removal of offices from the Alaska building to new office quarters recently constructed at the mill. "By having office and mill on the same site," says B. U. Myers, manager, "we will be able to give quicker and bettter service."

Trackson Appoints Distributor

The Valley Equipment Co., 2508-14 N. Broadway, St. Louis, Mo., has been appointed distributor for the Trackson lines, manufactured by the Trackson Company. It will cover the St. Louis territory and will be able to fill orders and furnish repair parts promptly. Herman Ehlig is manager of the Valley Equipment Co.

Foreign Competition Checking Mica Industry

Mica mining which struck its lowest level in North Carolina in 1927 recovered somewhat in 1928, but failed to gain the position which it formerly occupied. The production for 1927 totaled only $117,000, and in 1928 the output was valued at $198,344, more than a third above that of the preceeding year.

Decline in the production of mica in North Carolina reflects the trend in national yield with the State holding second place in the United States in 1927 and 1928. Only a few mines were operated for sheet mica, most of the production being as a by-product from feldspar mines, according to State Geologist H. J. Bryson in his annual report.

He declares that the price of mica continues to decrease as a result of foreign competition and continues, "It is reported by mica producers and manufacturers that mica can be imported from India, South Africa, and France cheaper than it can be produced at local mines. As a result of this condition, a great many of the mica finishing plants use the imported mica even though it is not as good as that produced locally. Unless a duty is placed on foreign mica, there will be no mines operated for mica in this State during the next few years."

United States Gypsum Acquisition

United States Gypsum Co. has just completed arrangements to take over the distribution, dealer and agency organization of Chromite Co.

Capacity production of Chromite Co.'s plant at Quincy, Ill., is now being increased to 5,000,000 square feet and it is contemplated that it will be increased to 10,000,000 later in 1930. Selling organization consists of 100 dealers, distributors and agents. This is the third product which United States Gypsum has contracted to distribute in addition to its own lines.

Illinois Second in Gravel Production

Figures just made public by the U. S. Bureau of Mines reveal that Illinois was second only to New York in the matter of sand and gravel production in 1928. The Illinois sand and gravel production was 30,069,361 short tons, valued at $10,243,555—about one-tenth of the national production figure. New York produced sand and gravel valued at $12,572,634. California was third and Michigan was fourth in this connection. Ohio, Pennsylvania, Indiana and Wisconsin were next in line.

Spruce Pine Enlarges Holdings

Spruce Pine Sand Company, Col. L. E. Wilson, Sheffield, Ala., has been organized to purchase the Spruce Pine Sand and Gravel Company. The properties will be operated in connection with Tennessee Sand and Gravel Company, also owned by Col. Wilson and associates. Capacity of the plant purchased will be increased by the new concern.

Fuller Company Makes an Announcement

The Fuller Company announces its pleasure in offering to the trade Fuller Rotary Compressors and Vacuum pumps, machines which it believes will appeal to users of this type of equipment on account of their simplicity of design, space required, and weight for given quantity of air handled.

It has added to the Engineering Department to handle this addition to its line of equipment qualified engineers who will appreciate an opportunity to discuss requirements for machines of this kind.

Geologist Sees Prospect to Develop Deposits

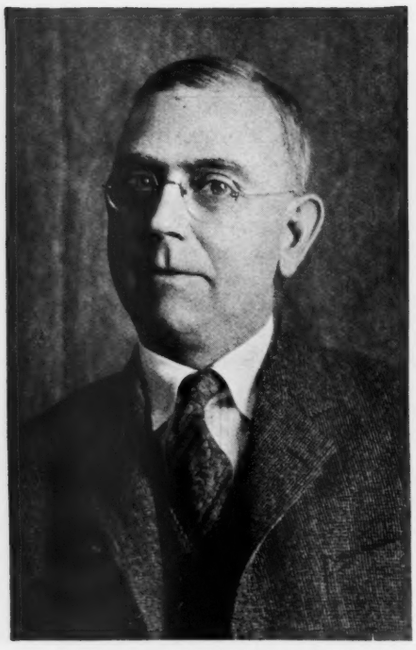
Commercial possibilities in the development of vermiculites of North Carolina, with reports of extensive deposits from several counties, are seen by State Geologist H. J. Bryson, who has been active in placing opportunities before manufacturers.

A publication of the Department of Conservation and Development says: "This supplementary group of the micas includes a number of micaceous minerals which are hydrated silicates, varying somewhat widely in composition and being in part closely related to the chlorites.

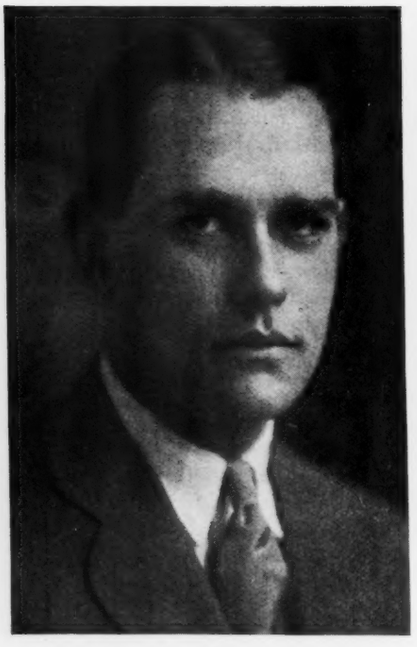
"They are alteration products of some of the micas and chlorites, and have usually retained the characteristic micaceous cleavage. The laminae are generally soft, pliable and inelastic with a pearly or bronze-like luster. The color varies from white to yellowish and brown. The common characteristics of all the vermiculites is the property of exfoliation; opening out into worm-like threads when heated.

N. N. Rogers, of Shooting Creek, Clay county, reports to State Geologist Bryson that he has found large deposits of the jefferisite variety of vermiculite in that county. "I have cut the vein at nine places, nearly a mile in length, and at several places 45 feet across. I have cut it at numerous places 30 feet across in a lead which is about one and one-fourth miles long."

Other specimens of vermiculite have been received by State Geologist Bryson from Yancey and Macon counties. The Clay county vein or dike material is described as being virtually pure or at least pure enough to obviate the necessity of milling or concentrating.



Charles M. Walden



H. M. Soars

L. A. McDowell

So far as information is available, the deposits of vermiculite in North Carolina are the only ones in eastern United States which offer commercial possibilities. Other sources of this mineral are in the west, Colorado and Montana, giving the North Carolina vermiculite a distinct advantage in freight rates to manufacturing centers of the east.

Sprout, Waldron Elects New President

At the annual meeting of the stockholders of Sprout, Waldron and Company, Jan. 1, 1930, Charles M. Waldron, vice-president, was elected president, to succeed F. M. Sprout, retired.

Mr. Waldron is a son of the late John Waldron, one of the founders and former president of the company. His entire life has been devoted to service for the company. He received his early training in the engineering department and on the road as a sales engineer. The last twenty years have been spent in the home office in sales promotion and production work, which has made him thoroughly familiar with every phase of the business. Activated by a desire to see the business grow, and to better and widen the service of his company, we bespeak a future of continued prosperity for the company of which he heads.

At the same meeting, H. M. Soars, who has been sales engineer for New England, was elected second vice-president and promoted to sales manager. Mr. Soars has a thorough knowledge of the requirements of the trade; knows the Monarch products and the facilities of the company to meet the requirements of industry.

The treasurer, Stephen Soars, and Secretary J. Russell Smith and the first vice-president, N. L. Vredenburg, continue in the offices which they have held for a number of years.

Freeman Manufacturing Announces Program For 1930

With the same enterprising spirit with which the company was founded, and which has kept it actively engaged as a manufacturing industry for over sixty years, the Freeman Manufacturing Company announces an aggressive program for this year. In fact, no doubt whatever can be entertained of the company's continued growth when the business caliber and financial standing of its new executives and board of directors is taken into consideration.

The president and treasurer, L. A. McDowell, was for several years general manager of the H. & M. Body Corporation. Just prior to accepting his present position, he was in charge of manufacturing and engineering in The Murray Corporation of America. Arthur Janes, vice-president of the Freeman Company, is president of the Standard Foundry of Racine. Victor D. Werner, secretary, is a member of the law firm of Quarles, Spencer & Quarles of Milwaukee. Other members of the board of directors in addition to the above, are: W. Harold Pugh, president of the Pugh Coal Company of Racine, Thos. B. Myers, vice-president and general manager of the Hamilton Beach Manufacturing Company.

The Freeman Manufacturing Company is a pioneer industry, having been established by Stephen Freeman in 1868. It manufactures a general line of steam boilers for power and heating. The company is making an improved hammer mill, which takes the place of the old fashioned feed grinder, and will be marketed extensively. Branch offices for the boiler division of the company are located in the leading industrial cities. Freeman products are known and used in every section of the United States and Canada. Business conditions as a whole, and orders in the hands of the company, according to Mr. McDowell, point to a successful business year in 1930 and a steady increase over recent months.

Mica Cutting Plant Opened

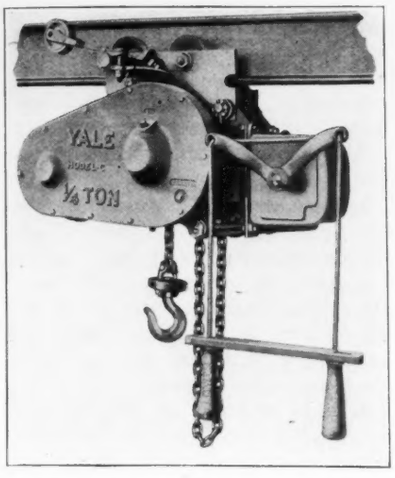
J. W. Roper, who formerly operated a mica cutting shop in Franklin, N. C., which was discontinued when the market demands changed, will open another plant. The mica, it is understood, will be prepared for shipment to the General Electric company.

The mica industry increased to some extent in the past 18 months, in North Carolina, but the prices, it is said, continue to decrease slightly, as a result of foreign competition. Mica producers and manufacturers in the State, declare that mica can be imported from India, South Africa and France, cheaper than it can be produced by local mines.

NEW MACHINERY AND SUPPLIES

Introduce New Ball Bearing Electric Chain Hoist

The Yale and Towne Manufacturing Co. has just brought out a new ¼-ton electric hoist. The hoist is adjustable to fit any size I-beam up to 9 in. and trolley-wheels and load sheave are mounted on ball bearings, greased through Alemite-Zerk fittings. The new hoist can be supplied with either push-button or manual control.



New ball bearing electric hoist

Improved Wire Cloth

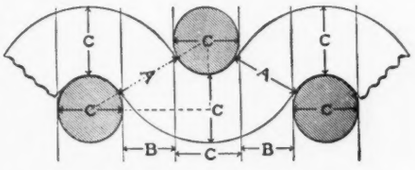
The Ludlow-Saylor Wire Co. of St. St. Louis announces that it has perfected a 50 by 50 mesh steel wire cloth made of No. 33 W. & M. gauge (.0118 in. diameter) wires.

This is the heaviest 50 by 50 mesh steel wire cloth ever made. The diameter of the wires is .0036 in. larger than the nominal opening between wires as listed in its literature. This nominal opening is .0082 in.

The illustration shows wires of larger diameter than the nominal opening between wires. It shows why the diagonal A, the available space between parallel wires through which transverse wires may pass, is considerably more than B, the nominal opening between wires.

C is the wire diameter; C^2 is the radius. Where the crimps are uniform both ways, A becomes a portion of the hypotenuse of a right triangle, of which the short leg is a dimension equal to $2C_2$, or C, and the long leg is equal to $B + 2C_2$, or $B + C$.

The hypotenuse being $A + 2C_2$, A may be found thus:



Magnified section showing screen having wires larger than the nominal openings between wires

$$A = \sqrt[2]{(B + 2C_2)^2 + C^2} = 2C_2$$

The Ludlow-Saylor Wire Co. makes a full line of wire cloth and woven wire screens in all grades and meshes, and in all commercial metals and alloys.

Improvements in Design of Blasting Machines

Recent developments in blasting machine design have practically eliminated the necessity for oiling the bearings, according to an announcement of Hercules Power Company's explosives technical service division.

Manufacturers of the one- to fifty-hole blasting machine have installed an armature shaft of special porous bronze, impregnated with graphite. During assembly a little oil is put on this shaft, and thereafter for the life of the machine the shaft bearing is self-lubricating. Troublesome oil cups have been eliminated, and the only oil now necessary to the blasting machine is a very small quantity occasionally applied externally to the rack bar.

The past year has marked considerable progress in blasting machine design, according to the technical service division manager, J. H. Horlick, Jr. An improved pocket size blasting machine of the dynamo type, the first of this kind to be manufactured in the United States, was introduced in the new Hercules-ten cap machine.

P&H Announces Seven New Models

Harnischfeger Corporation of Milwaukee, Wisconsin, has announced the addition of seven new models to its present line of excavators. With these new machines there is now a size to meet every requirement, from ½ to 3½ cu. yd. capacity.

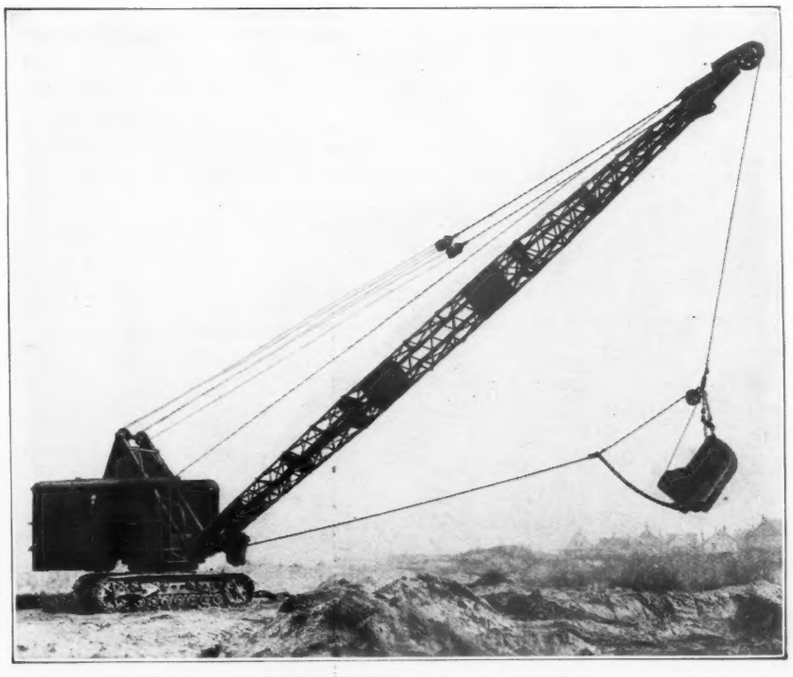
The new models are known as the 600-A (1 yard), 650 1¼ yard, 700-A (1¼ yard rock shovel), 750 (1½ yard), 775 (1½ yard long corduroy model), 800 (2½ yard), and 900 (3½ yard). All these excavators are fully convertible with the exception of the Model 775, which has especially long crawlers for low ground pressure requirements if needed.

On the new P&H's will be found a number of valuable improvements, which were adopted after actual field tests. These improvements include:

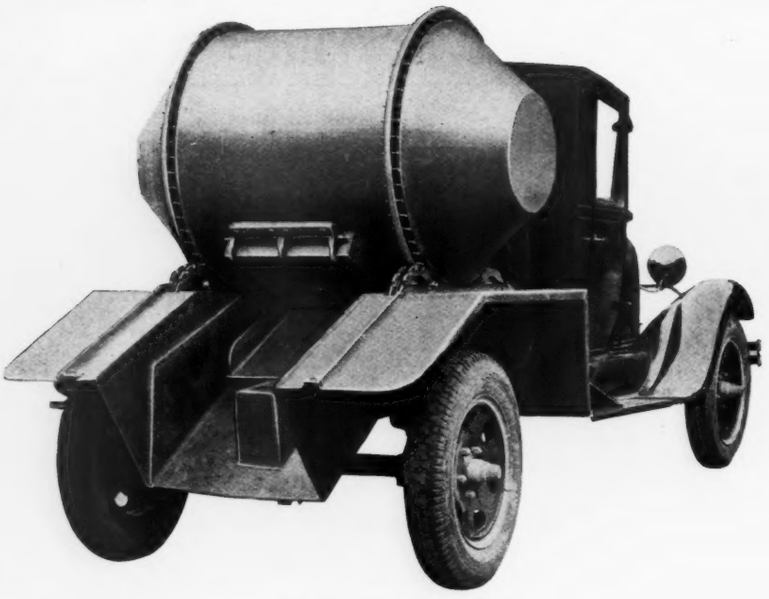
New internal expanding swing clutches.

Longer lived clutch and brake bands.

A stronger "fish belly" type of shovel boom, with larger cable sheaves.



A dragline, one of the new models



A new lightweight mixer

An exceptionally easy operating dipper trip.
Shock absorbing springs on the power clutch insure smoother operation and all machines can be equipped with the newest type, fully enclosed, dust-proof full Diesel motors.

All new models embody all of the time-proven features of P&H construction, such as Unit Cast Steel main frames, fool-proof, non-clogging crawlers, positive Independent Chain Crowd, and the use of a great number of alloy steel parts.

The P&H Model 300-A, the Model 400, and the 206-B are still built, which makes the complete line-up as follows:

Model 300-A—½ cu. yd.; gasoline or electric.
Model 400—¾ cu. yd.; gasoline, diesel or electric.
Model 206-B—⅞ cu. yd. shovel; gasoline or electric.
Model 206-B—1 cu. yd. crane; gasoline or electric.
Model 600-A—1 cu. yd.; gasoline, diesel or electric.
Model 650—1¼ cu. yd.; gasoline, diesel or electric.
Model 700-A—1¼ cu. yd.; extra heavy duty machine for rock excavation; gasoline, diesel or electric.
Model 750—1½ cu. yd.; gasoline, diesel or electric.
Model 775—1½ cu. yd.; dragline, clamshell-crane, and trench-hoe only; gasoline, diesel or electric.
Model 800—2½ cu. yd.; diesel or electric.
Model 900—3½ cu. yd; diesel or electric.

Models 300-A, 400, 206-B, 600-A, 650, 700-A, and 750 may be equipped as shovel, dragline, crane, clamshell, trench-hoe, skimmer-scoop, or pile-driver.

A Sturdy Light Weight Transit Mixer

The Lee Transit Mixer Company, Indianapolis, recently designed and is manufacturing a new type of transit mixer. It is said to be not only a new mixer, but a new kind of mixer drum which may be attached readily to any truck chassis and as quickly detached.

The 1-cu. yd. capacity drum, which is frequently made larger, is 5 ft. long by 3 ft. 6 in. in diameter; the door for charging and discharging is 2 ft. by 2 ft. with a dog-snap latch. There are six finger blades with 12-lb. rail supports, running in flanged wheels with sheet metal guards and fenders. The drum may be lifted off the truck by a crane or derrick and used as a bottom-dump bucket for reaching otherwise inaccessible points. It receives the power transmission by a St. Paul power take-off through Foote Bros. ball-bearing bronze gear 18 to 1 reduction; roller chain and sprocket gear transmission from gear reducer; six 1 15/16 babbitted pillow block bearings; and double-flanged toothed bearings and driving wheels are of cast iron or cast steel, and provided with Alemite lubrication.

The procedure is to drop a correct proportion of sand, gravel or stone, cement and water through the 2-ft. by 2-ft. door into the drum. Closing the door seals the drum which rotates four or five times per minute when the truck speed is 20 miles per hour. This is said to insure a perfect mix.

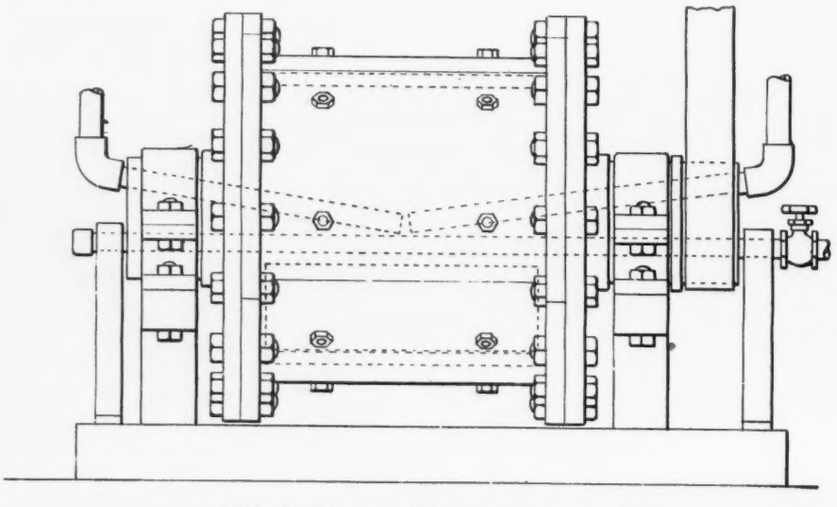
New Pendulum Roll Mill

A Pendulum roll mill has been designed by the Best Machinery Company. It has great merit and is a new and useful improvement in roll mills for rolling and grinding granite, cement, lime, gypsum, crushed stone, sand and gravel, silica sand, granite, marble, slate, slag, agstone, marl, phosphate, feldspar, asbestos, talc, soapstone, sandstone, fullers earth, salt, magnesite, graphite, mica, rock asphalt, sand-lime brick, concrete products and abrasives. It is operated with little power, has no gears and is belt driven.

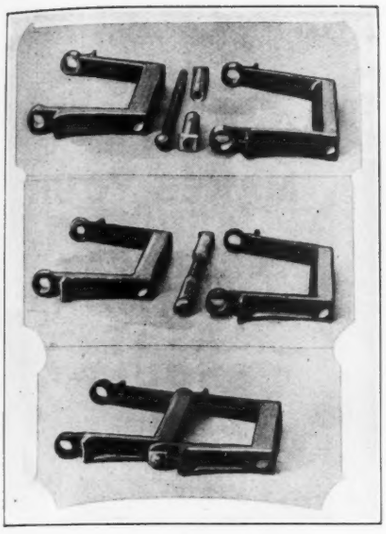
Dry and wet grinding may be done with equal facility and success. When dry pulverizing is done no changes are made in operation, just close water valve, then you have a dry machine. The roll mill is simple in construction, has few wearing parts which are easily replaced when worn, or may be replaced by similar parts designed for different kinds of work.

On account of free side and end discharge there is no clogging of screen space. Material is rolled, that is why capacity is larger. It is little expense and a profit maker.

The outer casing revolves and the rolls are operated in pendulum position. From one to four rolls are used, according to size of mills. Material is fed through feed pipes with water spray pipe; liner plates and roll shells are made of chilled chrome or manganese steel, and rolls are of suitable weight to provide the necessary pulverizing and grinding effect.



Rolls in this mill have pendulum motion



New type pintle conveyor

Composite Pintle Conveyor Chain

A new type of conveyor or drag chain (Brayton Patent) has recently been designed and developed by the American Manganese Steel Company, Chicago Heights, Illinois, for use in handling refuse in saw mills, cement clinker and any other material handled by drag chains.

The links are made from manganese steel which in itself gives better wearing qualities and consequently longer life. Added to this, the design of the pin has been materially changed. In place of the usual steel pin or rivet running clear through the body of the link, each link of the new chain is supplied with two hollow manganese steel bushing pins, one for each eye of the link. These are held in place by the usual steel pin passing through them in the link barrel. This bushing arrangement enlarges the bearing surface and does away with the bowing and distorting usual with the regular steel pins and the consequent elongating of the chain pitch and the trouble in removing or replacing the pins when worn. In this new design, which has been thoroughly proved in actual service, there is no bending of the pin or bushings, and when the chain must be repaired, it is much easier to accomplish.

New Air Cooled Single Stage Compressor

A new model air cooled single stage compressor has just been placed on the market by the Gardner-Denver Co., of Quincy, Ill. This is to be known as the A-C-E Model. It consists of a 3½ by 4 duplex compressor and a five horsepower motor mounted on a cast iron base on top of the air receivers. The unit has a displacement of 26 cu. ft. per minute, operating at a rate of 600 r. p. m. This rate can be reduced and altered to fit the particular circumstances.

Specifications follow: An outstanding feature is the enclosing of the suction and discharge valves in separate compartments. The valves are special, heat treated and ground steel discs. The use of the compartments prevents the air from being heated when passing through the intake valves.

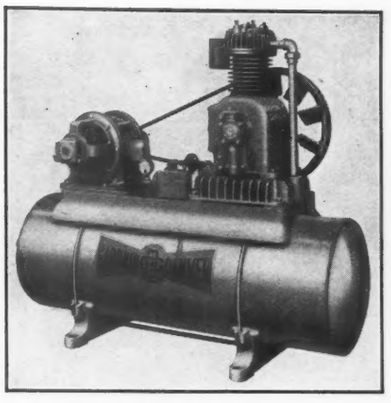
An automatic or hand operated start and stop control is furnished as standard equipment and operated in conjunction with the Penn type pressure and moisture unloader. The unloader is set to cut in at 130 lbs. and out at 165 lbs. Continuous operation is assured by this control.

Lubrication for the compressor is by the controlled splash type. A positive driven plunger pump on the outside of the crank-case feeds filtered oil to the troughs under the connecting rods. A special oil ring and groove on the piston prevents oil from passing over to the discharge lines. An oil level gives positive indication of the amount of oil in the reservoir.

Other features claimed for this compressor are: The use of the V-type belt drive; a fan type of flywheel; use of Hyatt type of roller bearings; after-cooler in the base and a muffler for the suction opening.

An Improved Crusher With Roller Bearings

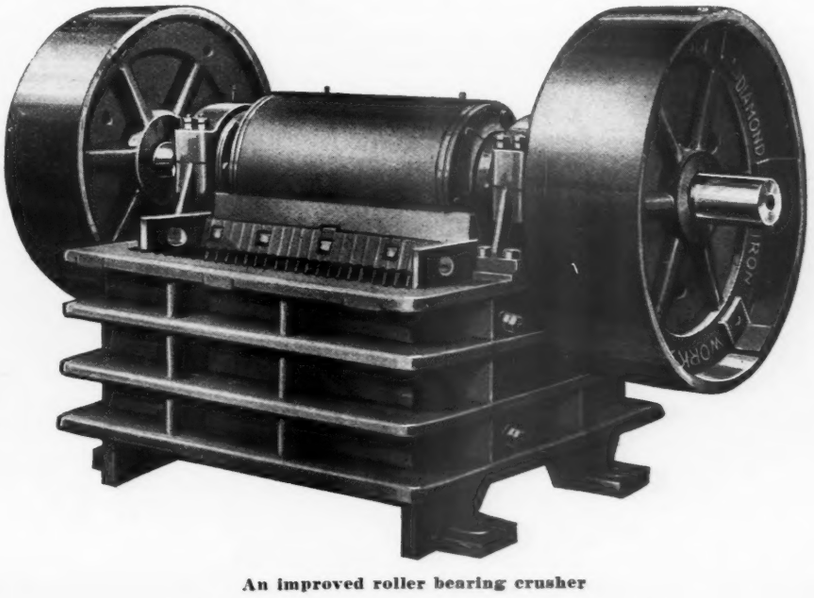
The Diamond Iron Works, which specializes in crushing, conveying and power transmission machinery, has designed and is installing a roller-bearing crusher which includes several important features. This crusher is similar to the one being installed



Air cooled single-stage compressor

and operating satisfactorily with the exception that it is now equipped with Timken roller bearings. The Diamond Iron Works, in conjunction with the Timken people, made many tests during 1929 with the result that this crusher, size 8 in. by 36 in., equipped with Timken roller bearings, operating to full capacity, used 18 hp., the average for the regular bearing crusher being from 25 hp. to 30 hp.

The crusher is the result of many years' experience in building various types and designs of rock crushers. The small opening and long jaw give it the capacity to take hold of the material with the least belching. The jaws of cast steel are faced with reversible manganese steel plates with heavy corrugations. The frame of the machine is a one-piece annealed casting, reinforced with deep ribs. The adjusting mechanism makes it possible to change the size of the product without stopping the machine. The product is uniform because the opening at the bottom varies little, as the greatest action of the pitman is at the top.



An improved roller bearing crusher

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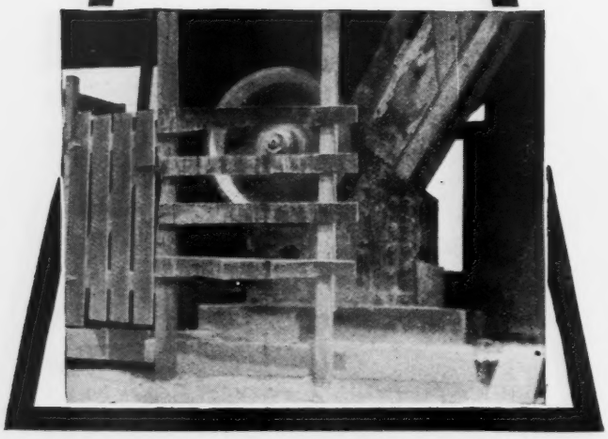

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